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

Forest Statistics Ireland 2022

Prepared by the Department of Agriculture, Food and the Marine

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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.

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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; "Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU", commonly referred to as the LULUCF Regulation"
- Food and Agriculture Organisation (FAO) for series of forest related data including the Global Forest Resource Assessment;
- Statistical office of the European Union (EUROSTAT);
- United Nations Economic Commission for Europe (UNECE) for wood harvest and trade data (the Joint Forest Sector Questionnaire);
- Joint Wood Energy Enquiry of the UNECE, IEA and FAO;
- FOREST EUROPE (The brand name of the Ministerial Conference on the Protection of Forests in Europe);
- European Commission in respect of forest health.

Forest Statistics is an annual compilation of statistics on the forests 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. The data in each report relate to the year prior to the year of publication e.g. the data range in the 2022 edition includes information up to the end of 2021. However, as there is a certain time-lag before statistics are finalised for a given year, the relevant sections will be revised to include the new data when it becomes available.

2. Forest Area

Key Facts

- Forest trees began recolonising Ireland following the end of the last glacial stage 10,000 years ago. Analysis of pollen from peat bogs illustrates the establishment of forests that once covered 80% of the land surface;
- The area of forest is estimated to be 808,848 ha or 11.6% of the total land area of Ireland (National Forest Inventory 2022);
- Forest cover is estimated to be at its highest level in over 350 years;
- Of the total forest area, 397,364 ha or 49.1% is in public ownership, mainly Coillte[1];
- The forest estate is comprised of 69.4% conifers and 30.6% broadleaves;
- Seventy percent of the stocked forest area is less than 30 years of age.

2.1 Forest definition

The National Forest Inventory defines forests 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.

2.2 Forest area

In 2022, the 4th National Forest Inventory (NFI) estimated the area of forest to be 808,848 hectares or 11.6% of the land area, excluding inland water bodies.

Trees began recolonising Ireland at the end of the last glacial stage 10,000 years ago. Analysis of pollen from peat illustrates the establishment of forests that once covered 80% of the land surface[2]. In the sixteenth and early seventeenth centuries significant forest exploitation occurred as a result of the cutting of wood for use in: ships, barrel staves, and for charcoal for iron and glass work. By the early 1700's all but the least accessible forests had been cleared.[3]

The changes in forest cover in Ireland since 1656 are indicated in Table 1 and Figure 1. 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 forest cover on the island of Ireland was still declining up to 1928.

Since the foundation of the State, forest cover in Ireland has grown from 1.4% of the land area, to the current 11%. Figure 2 shows the growth in area of both public and private forests over this period. Five inventories of the private forest estate have taken place: 1973, 2006, 2012, 2017 and 2022. The area of privately-owned forests has increased from 81,958 ha in 1973 to 412,680 ha in

[1]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, Food and the Marine.

[2] Mitchell, J. G. 1995. The Dynamics of Irish Post-Glacial Forests. In: Wood, trees and forests. Royal Irish Academy. Proceedings of a Seminar Held on 22 and 23 February 1994. Dublin

[3]Anon. 1979. *Irish Forestry Policy*. National Economic and Social Council. Government Publication Office

2022, over a five-fold increase. Over the same period, the State-owned forest area has also significantly increased from 242,056 ha to 396,168 ha. The 808,848 ha of forest in Ireland in 2022 represents 11.6% of the total land area (Figure 3).

Table 1: Development of forest area in Ireland

Year	Area (ha)	% of Total Land Area
1656[4]	170,000	2.5
1841[5]	140,000	2.0
1908[6]	125,200	1.8
1918[7]	100,717	1.4
1928[8]	89,000	1.2
1942[9]	87,066	1.3
1950[10]	96,047	1.4
1965[11]	254,350	3.7
1973[12]	323,654	4.6
1985[13]	411,529	5.9
2006[14]	697,730	10.1
2012[15]	731,650	10.5
2017[16]	770,020	11.0
2022[17]	808,848	11.6

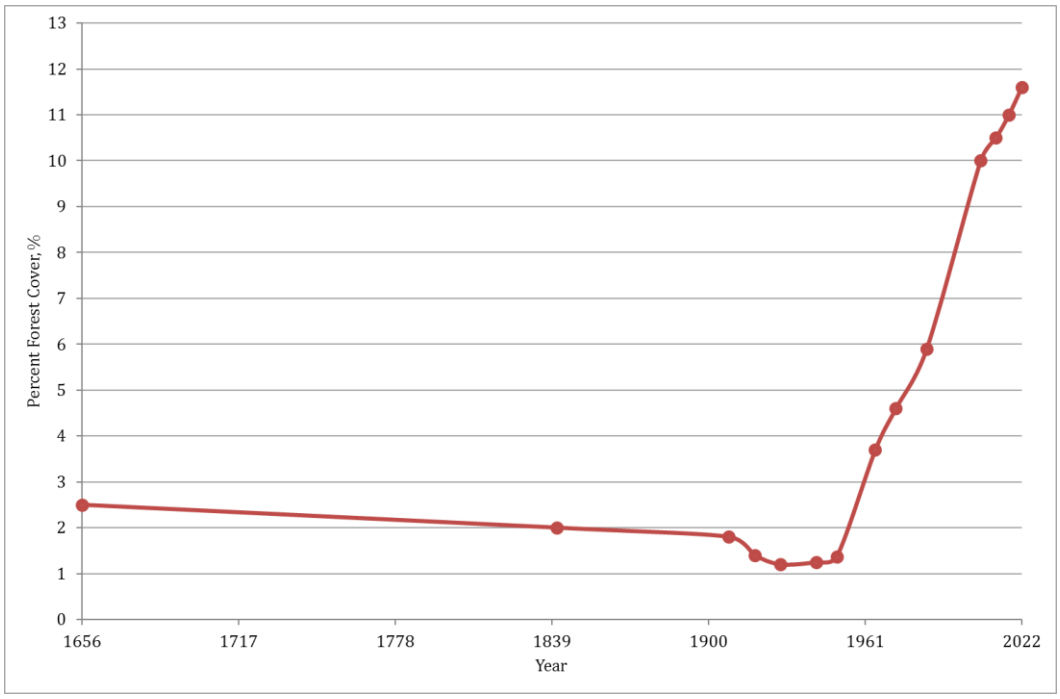

Figure 1: Ireland's forest cover, 1656-2022

[4] Rackham, O., 1986. *The History of the Countryside*. Dent & Sons Ltd., London.
[5] Aalen, F. H. A., Whelan K. and Stout M. (Eds). 1997. *Atlas of the Irish Rural Landscape*. Cork University Press
[6] Dept. of Agri. & Technical Instruction. 1908. *Report of the Departmental Committee on Irish Forestry*. A. Thom & Co.
[7] Dept. of Agriculture, 1926. *Forest Lands and Timber Supply in the Irish Free State*. Proceedings of the First International Congress on Sylviculture, Rome, 1926.
[8] Minister for Lands & Agriculture. Dail Eireann, Volume 23, 3rd May 1928.
[9] Report on Forestry Mission to Ireland, 15th February 1951. Published by Food and Agriculture Organisation.
[10] Report on Forestry Mission to Ireland, 15th February 1951. Published by Food and Agriculture Organisation.
[11] Estimate generated from Annual Report of the Department of Agriculture, 1964/65.
[12] 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.
[13] Estimate generated from Annual Report of the Department of Agriculture, 1985.
[14] *National Forest Inventory Republic of Ireland Results*. 2007. Dept. of Agriculture, Fisheries and Food.
[15] *National Forest Inventory Republic of Ireland Results*. 2013. Dept. of Agriculture, Food and the Marine.
[16] *National Forest Inventory Republic of Ireland Results*. 2017. Dept. of Agriculture, Food and the Marine.
[17] *National Forest Inventory Republic of Ireland Results*. 2022. Dept. of Agriculture, Food and the Marine. (Preliminary results)

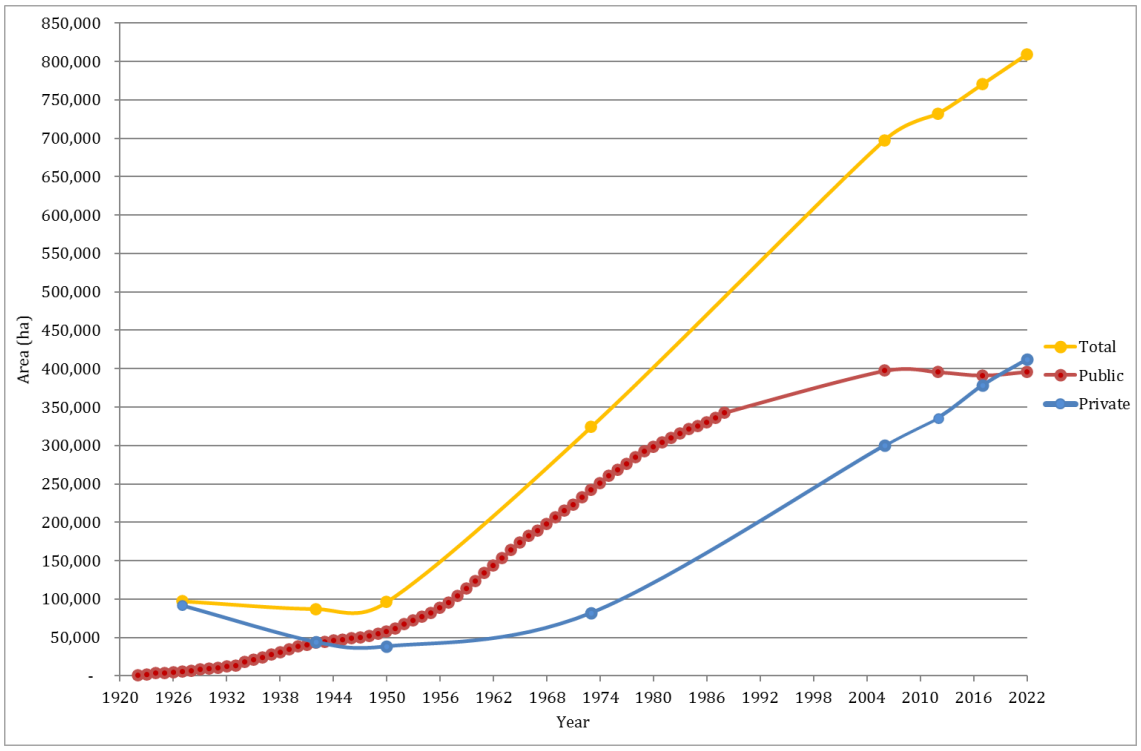

Figure 2: Forest area change since the foundation of the State, 1922-2022

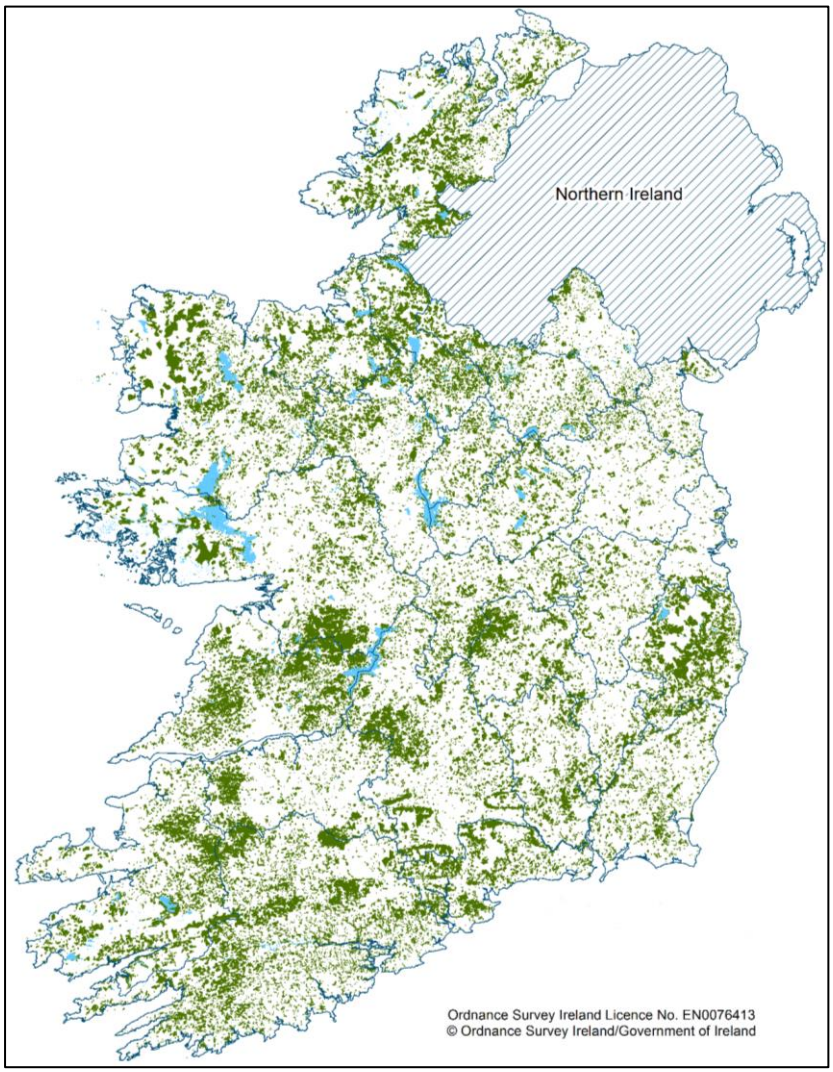

Figure 3: Forest cover in Ireland

2.3 County Forest Area

Leitrim is the county with the highest percentage of forest cover (20.1%), while Cork has the largest forest area (92,471 ha) (Table 2).

Table 2: Forest Area by County (NFI, 2022)

County	Forest Area (ha)	Percent Forest Cover within County (%)
Carlow	8,803	9.8
Cavan	19,635	10.1
Clare	57,447	18.0
Cork	92,471	12.4
Donegal	57,155	11.8
Dublin	6,011	6.5
Galway	63,795	10.4
Kerry	57,540	12.1
Kildare	11,196	6.6
Kilkenny	20,634	10.0
Laois	28,466	16.6
Leitrim	32,039	20.1
Limerick	28,332	10.5
Longford	10,355	9.5
Louth	2,428	2.9
Mayo	55,736	10.0
Meath	13,729	5.9
Monaghan	5,997	4.6
Offaly	33,351	16.7
Roscommon	31,547	12.4
Sligo	22,167	12.1
Tipperary	52,235	12.3
Waterford	27,351	14.9
Westmeath	16,759	9.1
Wexford	16,200	6.9
Wicklow	37,470	18.5
Total	808,848	

2.4 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 (non grant-aided)**: private forests not in receipt of grant-aid post 1980. Includes areas semi-natural forests that have regenerated naturally and other long-standing plantations on private estate holdings.

For the first time in the history of the state, there are more privately owned forests than publicly owned forests. In 2022, 49.1% of forests were in State ownership, a reduction from 50.8% in 2017 (Table 3). The expansion of the private sector forest cover is a result of afforestation and natural expansion of semi-natural forests.

Table 3: Forest ownership in Ireland (NFI, 2022)

Ownership	Area (ha)	%
Public	397,364	49.1
Private (grant-aided)	288,497	35.7
Private (non grant-aided)	122,987	15.2
Total	808,848	100

2.5 Forest composition

The national forest estate is expanding and now stands at 11.6% of the total land area, with a wide variety of forest types present. The majority of the forests are considered stocked as there are tree species present. Forest open areas (e.g. firebreaks) and temporarily unstocked areas (e.g. areas awaiting replanting) are also present and these are an integral part of the forest estate (Table 4).

Of the total forest area, 88.2% comprises areas occupied by trees or potentially occupied by trees, while permanently unstocked open area within the forest (roads, ridelines, powerlines, etc.) comprises 10.9%. Sitka spruce is the most common species, occupying 44.6% of the total forest area and over one quarter (27%) of the overall forest area contains broadleaves. The percentage of each species is also presented in terms of the total stocked forest area (Table 5).

The interpretation of stocked areas of individual species presented in Table 4 and Table 5 needs to be carefully considered since many forests contain an intimate mixture of species[18].. Methods are used to apportion the constituent individual species from these intimate mixtures into the total area covered by the forest. The total 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.

[18] 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, nothofagus spp., 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: Composition of the total forest area (NFI, 2022)

Forest Composition		Area (1,000s ha)	%
Stocked Forest Area (i.e. the area with trees present)	Sitka spruce	360.9	44.6
	Norway spruce	27.0	3.8
	Scots pine	8.4	1.2
	Other pine spp.	62.8	8.8
	Douglas fir	9.3	1.3
	Larch spp.	23.8	3.3
	Other conifers	2.9	0.4
	Total Conifer	495.1	61.2
	Pedunculate and sessile oak	20.2	2.5
	Beech	10.7	1.3
	Ash	24.3	3.0
	Sycamore	10.5	1.3
	Birch spp.	58.0	7.2
	Alder spp.	19.7	2.4
	Other short living broadleaves	63.3	7.8
	Other long living broadleaves	11.4	1.4
	Total Broadleaf	218.1	27.0
	Total stocked forest	713.2	88.2
Forest Open Area		88.1	10.9
Temporarily Unstocked Area		7.6	0.9
Overall Forest Area		808.9	100

Table 5: Species Composition of the total stocked forest area (NFI, 2022)

Species	Area (ha)	%
Sitka spruce	360.9	50.6
Norway spruce	27.0	3.8
Scots pine	8.4	1.2
Other pine spp.	62.8	8.8
Douglas fir	9.3	1.3
Larch spp.	23.8	3.3
Other conifers	2.9	0.4
Pedunculate and sessile oak	20.2	2.8
Beech	10.7	1.5
Ash	24.3	3.4
Sycamore	10.5	1.5
Birch spp.	58.0	8.1
Alder spp.	19.7	2.8
Other short living broadleaves	63.3	8.9
Other long living broadleaves	11.4	1.6
Total	713.2	100

2.6 Forest age

The majority (70%) of Ireland's forests consists of trees of 30 years old or less (Figure 4). The age structure of the national forest estate differs according to ownership: 64.4% of the public forest is aged 30 years or less, 89.3% of the Private (grant-aided) category is aged 30 years or less, and 45.3% of the Private (non grant-aided) category is aged 30 years or less.

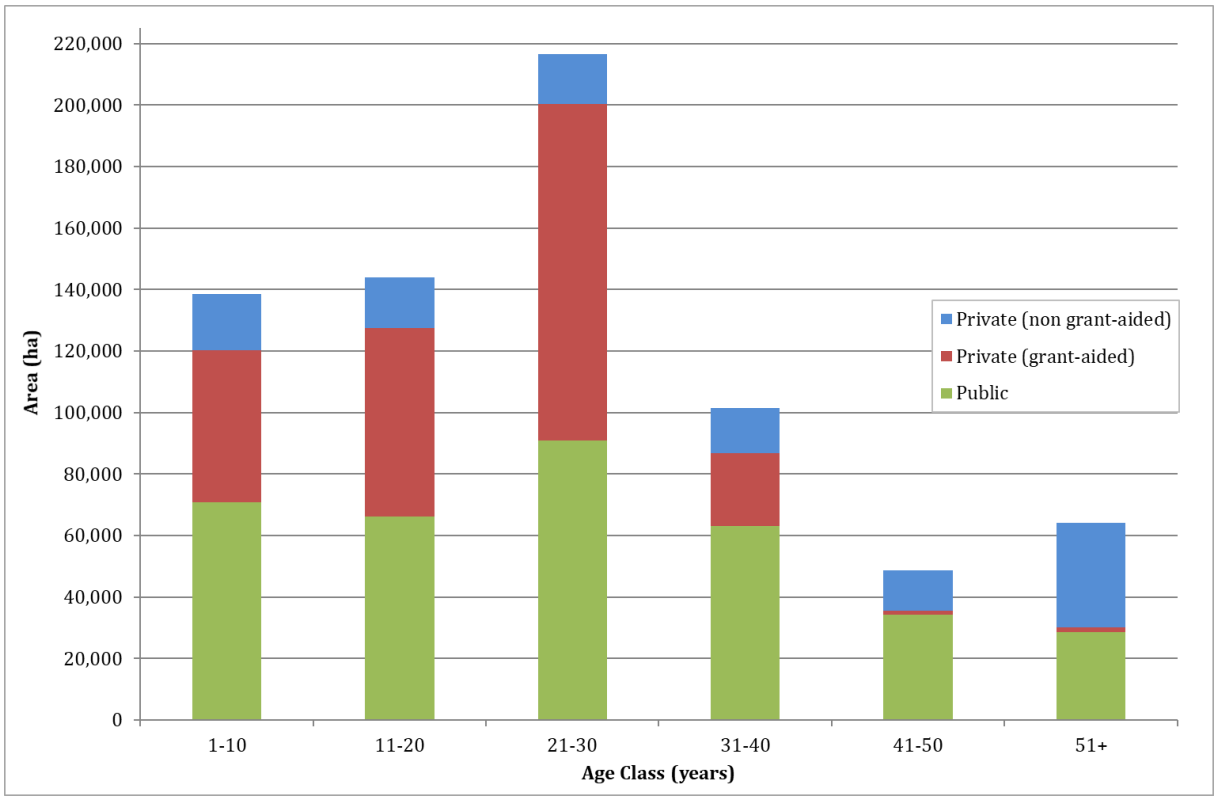

Figure 4: Forest age-class distribution by ownership (Source: NFI, 2022)

2.7 Hedgerows and Trees outside the Forest

2.7.1 Extent of Hedgerows and Trees outside the forest

In 2011 Teagasc produced a hedgerow map of Ireland, based upon 2005 orthophotography[19]. All areas of mature hedgerows, individual trees and non-forest woodland and scrub were digitally mapped to a 1 metre resolution. National cover of hedgerows, individual trees and non-forest woodland and scrub was estimated at approximately 482,000 ha, or 6.4%, with an 80% accuracy. Table 6 displays the results on a county level.

The third National Forest Inventory (2017) estimates national hedgerow and non-forest other wooded land at 347,690 ha, or 4.9% cover. This estimate differs from the Teagasc Irish Hedge Map estimate from 2011, which is most likely due to differing methodologies. In addition, the Teagasc Irish Hedge Map includes areas of non-forest woodland and scrub that under the NFI were classified as Forest.

Table 6: County level estimates of non-forest hedgerow, scrub and woodland (HSW) cover (The Irish Hedge Map, Teagasc, 2011)

County	Area of HSW (ha)	% of National HWS Stock	% of County under HWS
Galway	30,000	6.7	4.9
Leitrim	11,000	2.4	6.9
Mayo	23,000	5.1	4.1
Roscommon	19,000	4.2	7.5
Sligo	11,000	2.4	6
Carlow	8,000	1.8	8.9
Dublin	5,000	1.1	5.4
Kildare	14,000	3.1	8.3
Kilkenny	19,000	4.2	9.2
Laois	12,000	2.7	7
Longford	8,000	1.8	7.3
Louth	8,000	1.8	9.8
Meath	24,000	5.3	10.2
Offaly	13,000	2.9	6.5
Westmeath	17,000	3.8	9.2
Wexford	20,000	4.4	8.5
Wicklow	10,000	2.2	4.9
Clare	22,000	4.9	7
Cork	57,000	12.7	7.6
Kerry	23,000	5.1	4.8
Limerick	25,000	5.6	9.3
Tipperary	35,000	7.8	8.1
Waterford	12,000	2.7	6.5
Cavan	20,000	4.4	10.4
Donegal	20,000	4.4	4.1
Monaghan	16,000	3.6	12.4
Total	482,000	6.4	

[19] *The Irish Hedge Map* – Version 1.0. Teagasc, 2011.

2.7.2 Agri-Environmental Schemes

Since the introduction of agri-environmental schemes in 1994 a total of 6,605 kilometres of new hedgerows and more than 3.7 million trees have been established on non-forest land (Table 7).

Table 7: The total estimate of newly established hedgerows and trees under agri-environmental schemes (Department of Agriculture, Food and the Marine, 2018)

Scheme	Newly established hedgerows (km)	Newly planted trees	Newly planted orchard trees
Rural Environment Protection Scheme (REPS) 1994 - 2010	4,100	1,702,972	N/A
Agri-Environnent Options Scheme (AEOS) 2010 - 2014	1,322	464,910	N/A
Green Low Carbon Agri-Environment (GLAS) 2014 - 2018	1,183	1,617,516	11,182
Total	6,605	3,785,398	11,182

2.7.3 Biomass and Carbon

A 2014 report from the Environmental Protection Agency (EPA) examining the feasibility of a national hedgerow inventory estimated that hedgerow and non-forest woodland and scrub could potentially be sequestering 0.66 - 3.3 tonnes of CO_2/ha/year[20]. Based on existing national estimates for hedgerow and non-forest woodland and scrub cover, it states that this could result in a net removal of 0.27-1.4 Mt CO_2/year. The value of hedgerows and trees outside of forests is reflected in recently introduced agri-environmental measures which have resulted in the establishment of new hedgerows and trees outside of the forest.

A second EPA project titled, *Biomass Retrieval in Ireland using Active Remote sensing (BRIAR)*[21], examined the use of radar to estimate biomass stocks in hedgerows. The Ordnance Survey Prime2 spatial data storage model was applied in conjunction with developed maps showing the probability of a field boundary being a stone wall or a hedgerow, to give a new national estimate for hedgerow length in Ireland of 689,000 km. This estimate is double the frequently quoted figure of 300,000 km because of a much wider definition of "hedgerow" used in the BRIAR report. Net change in hedgerow length was examined using the aerial photographic records from 1995, 2005 and 2015, along with county-level survey records, showing that there has been a net removal of hedgerows between 1995 and 2015 of between 0.16% and 0.3% per annum, although the rate is much slower in the latter half of that period.

[20] *Carbon Sequestration by Hedgerows in the Irish Landscape. Climate Change Research Programme (CCRP) 2007–2013 Report Series No. 32. Environmental Protection Agency, 2014.*

[21] *BRIAR: Biomass Retrieval in Ireland using Active Remote sensing. EPA Research Programme 2014–2020 Report Series No. 2014-CCRP-MS.17. Environmental Protection Agency, 2019.*

3. Afforestation

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

Key statistics

- State afforestation was relatively low up until the 1950's, but thereafter increased up to the year 2000;
- Private afforestation came to the fore in the mid-1980's: 304,000 ha of private forests were established between 1980 and 2021;
- The proportion of broadleaf afforestation significantly increased after 1993, and up to the present, averaging 19% of all afforestation since that year. Broadleaf afforestation accounted for 41% of the area afforested in 2021;
- Tree diseases such as *Phytophthora ramorum* (mainly affecting larch) and Ash Dieback *(Hymenoscyphus fraxineus*) may influence species diversity into the future;
- The average size of private grant-aided parcels of land afforested between 1980 and 2021 was 8.6 ha;

3.1 Afforestation

As was outlined in Table 1, the 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 1950's. The level of State afforestation dramatically increased from the 1950's up to 2000, after which State planting declined to a negligible level.

Private afforestation came to the fore in the mid-1980's 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 1980's and 1990's are shown in Figure 1Figure 5.

Figure 6 displays the ratio of broadleaf and conifer afforestation from 1935 to the present. During the 1930's and 1940's, afforestation consisted of approximately 90% conifer species and 10% broadleaf species, and from the late 1940's to the early 1990's, broadleaves comprised approximately 4% of all 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 increased significantly from 1993 up to the present, reaching a high of 37% from 2008 to 2011. Broadleaf afforestation subsequently declined to 20% in 2015 and 2016, primarily due to restrictions on planting ash (due to *Hymenoscyphus fraxineus*), but by 2021 had increased to 41% of all afforestation. Over the past 20 years (2001 to 2021), broadleaf afforestation has averaged 24% and conifers 76%.

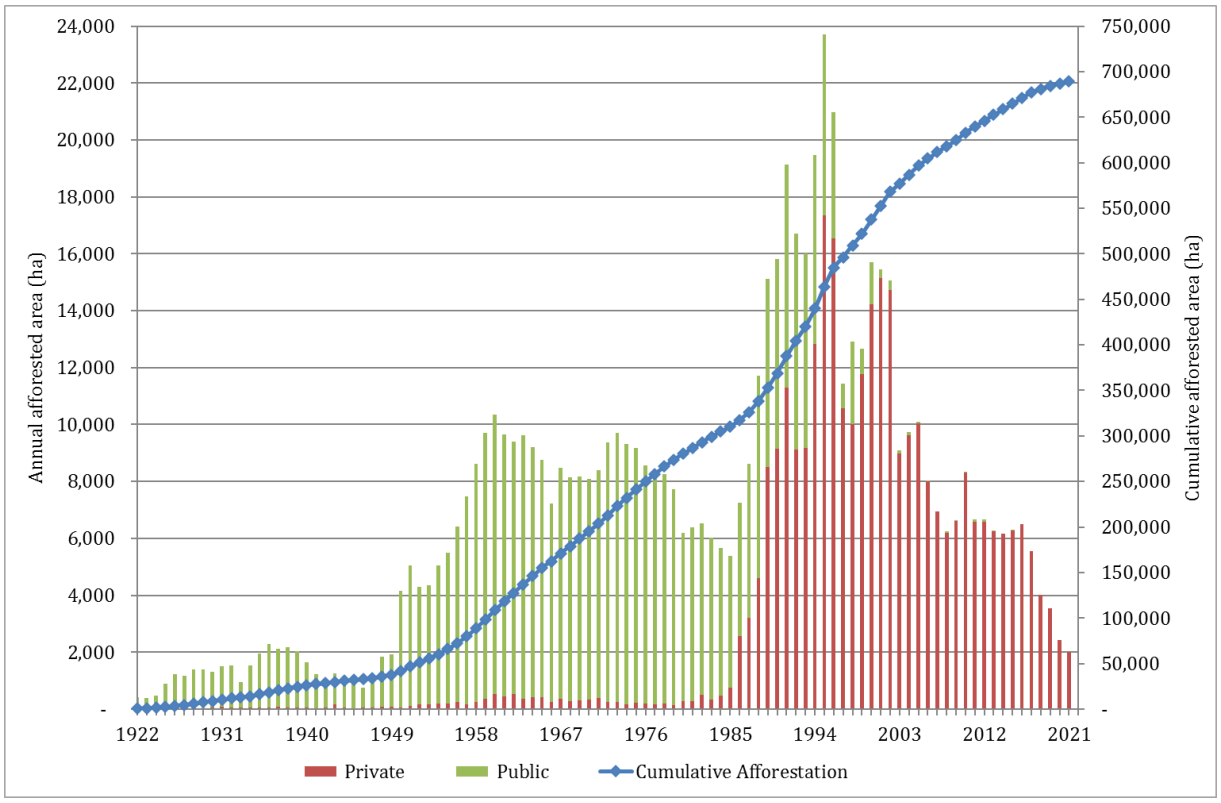

Figure 5: Annual State and private afforestation (1922-2021)

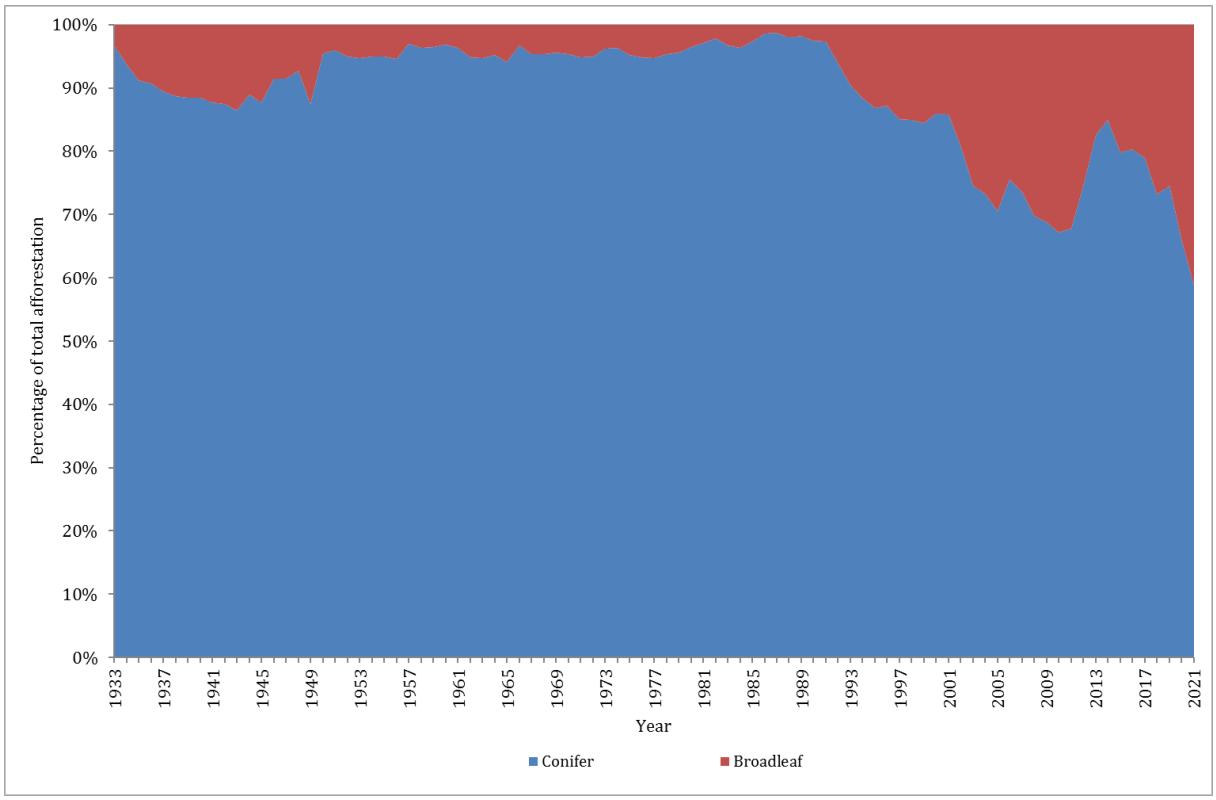

Figure 6: Conifer and broadleaf afforestation (1935-2021)

A range of conifer species were planted in the 1930's and 1940's, 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 1950's onwards, confidence in Sitka spruce and lodgepole pine grew, leading to their dominance in afforestation up to the mid-1990's, 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 detection of *Phytophthora ramorum* in Japanese larch in 2010, led to its withdrawal from the afforestation programme (Figure 8). From the mid-1990's onwards a wider range of tree species has been planted, with ash and oak dominating broadleaf planting. However, more recently, the fungal disease *Hymenoscyphus fraxineus* (Ash Dieback) was found in ash in 2012, resulting in the cessation of grant aid for this species and a subsequent contraction in broadleaf species for afforestation from 2012 to 2016. Nearly 17,000 ha of ash have been planted since 1990.

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.

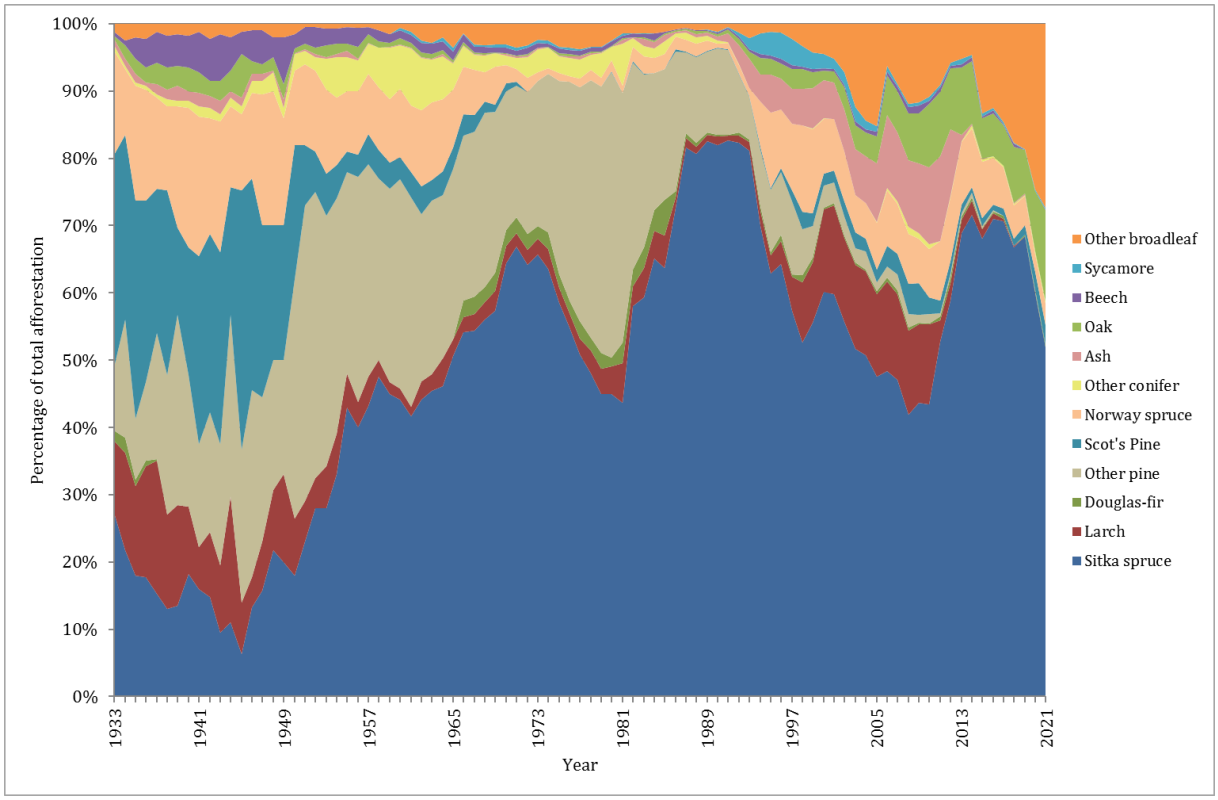

Figure 7: Species groups used in afforestation (1935-2021)

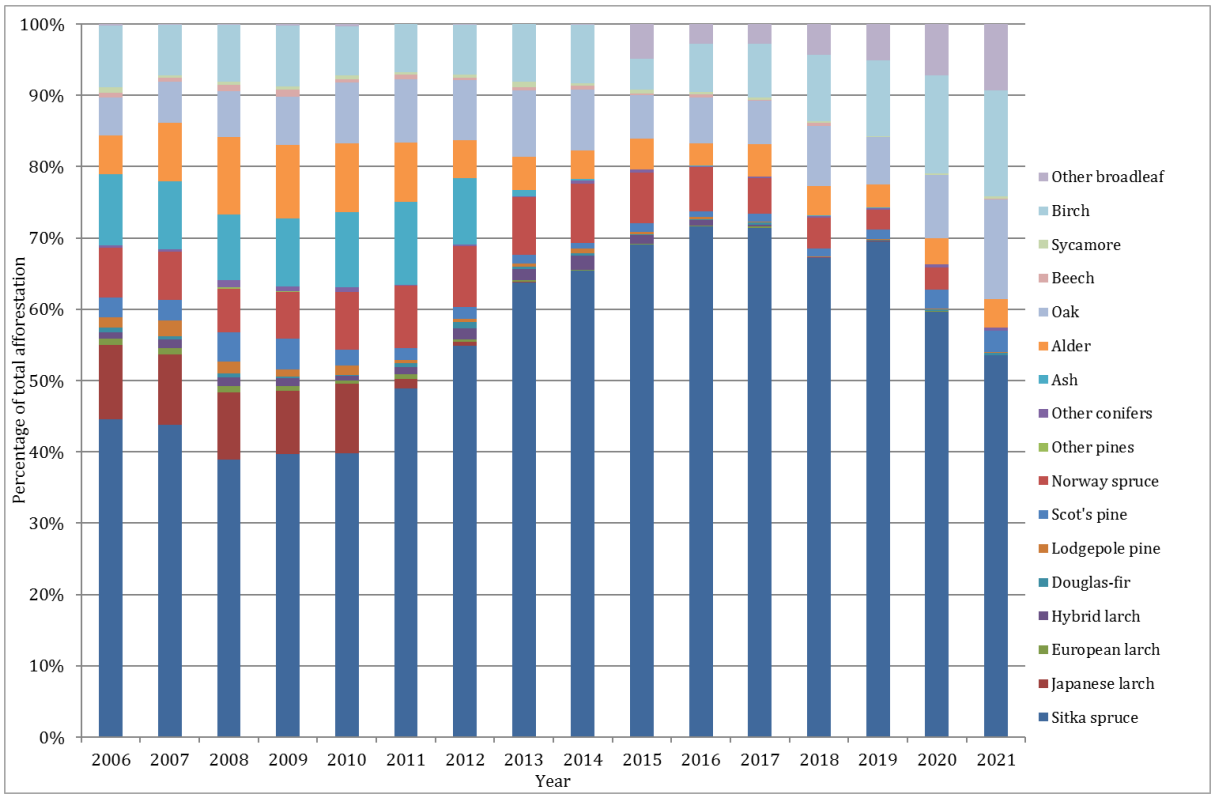

Figure 8: Grant-aided species groups (2006-2021)

3.2 Private lands afforested, forest size and number

The average size of private grant-aided afforestation between 1980 and 2021 was 8.6 ha (Table 8). From 1980 up to the mid-1980's the average afforestation parcel was relatively small at 5.9 ha, but with the introduction of the grant and premium scheme average afforestation increased to 9.6 ha by the mid-1990s. By 2021 the average area afforested has decreased to 7.1 ha as a result of planting consisting of a portion of 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 9 and Figure 10Figure 9). shows that large sized individual plantings were a feature of mid 1980's- late 1990's 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 forestry application greater than 50 ha has been established. Since 2010 all afforestation applications are screened to determine whether they require an EIA, and all developments over 50 ha are subject to a mandatory Environmental Impact Statement. Presently, 32% of the total afforested area (1980-2021) consists of plantations greater than 20 ha, 63% are greater than 10 ha and 74% are greater than 7.5 ha in size.

Table 8: Size and number of individual private grant-aided afforestation (1980-2021)

Year	Number of forests		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	9.3	9.3
1992	620	4,491	9.3	9.3
1993	1,036	5,527	7.9	9.0
1994	1,342	6,869	10.1	9.2
1995	1,468	8,337	11.0	9.6
1996	1,479	9,816	9.3	9.5
1997	1,275	11,091	9.1	9.5
1998	1,135	12,226	9.7	9.5
1999	1,141	13,367	10.3	9.6
2000	1,292	14,659	10.7	9.7
2001	1,371	16,030	10.3	9.7
2002	1,269	17,299	9.7	9.7
2003	1,132	18,431	8.5	9.6
2004	952	19,383	8.9	9.6
2005	1,343	20,726	8.3	9.5
2006	1,128	21,854	8.1	9.4
2007	836	22,690	7.1	9.4
2008	685	23,375	8.1	9.3
2009	731	24,106	8.7	9.3
2010	946	25,052	8.1	9.3
2011	895	25,947	7.4	9.2
2012	908	26,855	6.4	9.1
2013	1,008	27,863	6.6	9.0
2014	1,021	28,884	6.0	8.9
2015	929	29,813	6.5	8.8
2016	990	30,803	6.6	8.8
2017	895	31,698	6.4	8.7
2018	592	32,290	6.8	8.7
2019	453	32,743	6.9	8.6
2020	347	33,090	6.9	8.6
2021	261	33,351	7.1	8.6

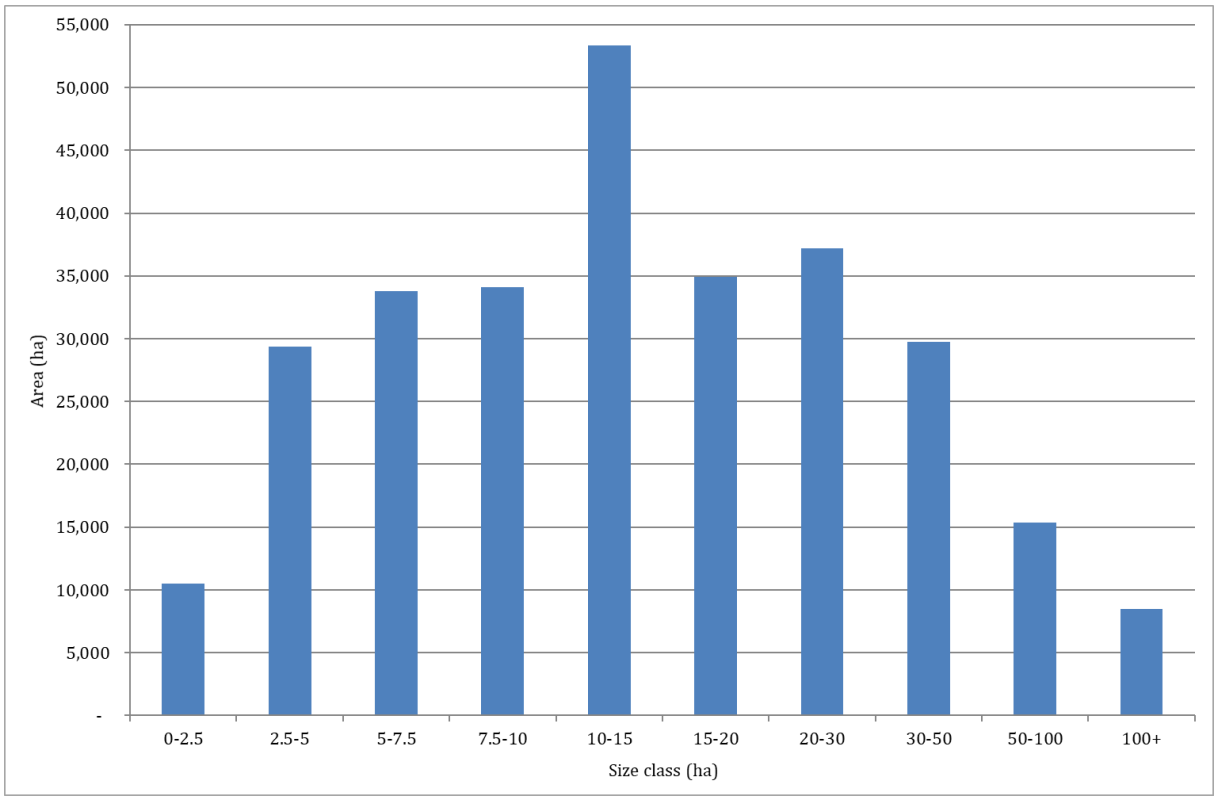

Figure 9: Size class distribution of private grant-aided afforestation (1980-2021)

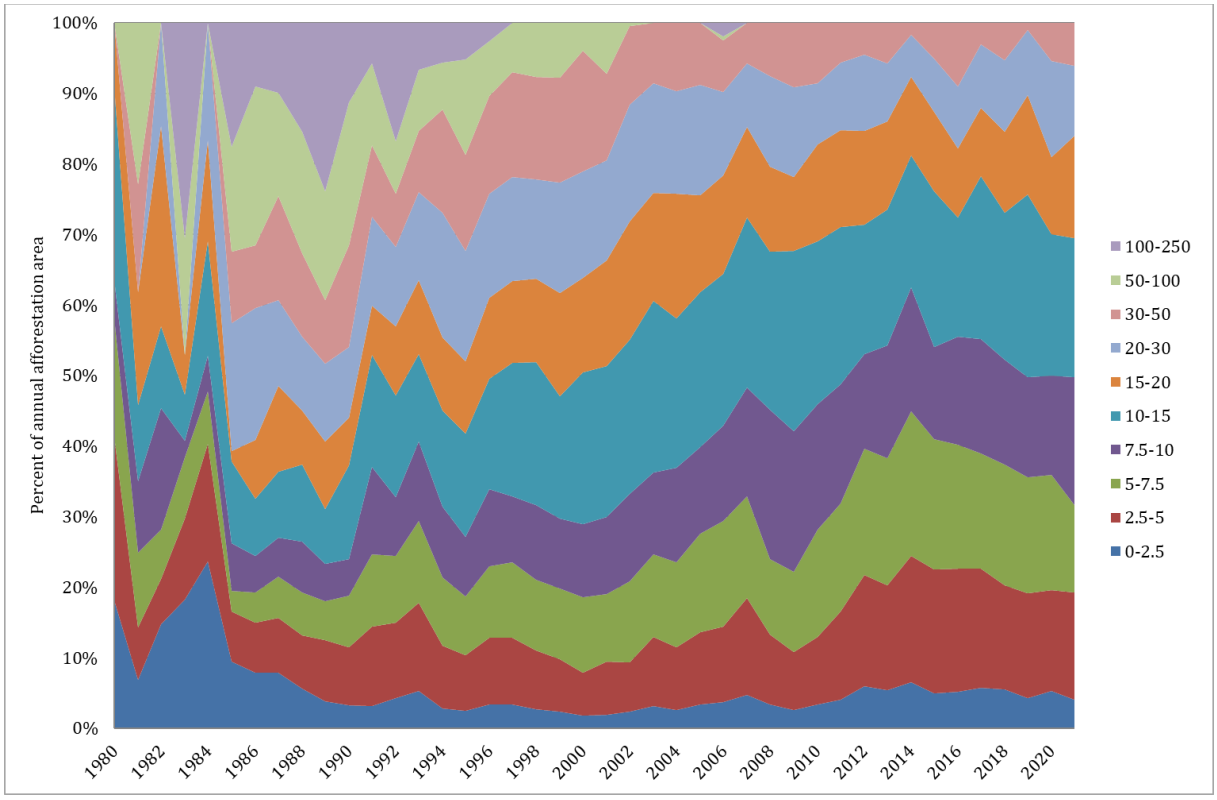

Figure 10: Proportion of annual private grant-aided afforestation area by size class (1980-2021)

3.3 Grant Premium Category

Figure 11 outlines the total area of grant-aided afforestation by Grant Premium Category (GPC). Grant and premium categories are used in the afforestation scheme to label different species and species groupings.

GPC 3 (Sitka spruce, plus other species) has been the most popular category, increasing from 48% in 2004 to 79% in 2016. The increase in the area of GPC 3 is in part due to the removal of ash and larch from the afforestation programme due to Chalara and *Phytophthora ramorum* but also due to the reduction in the area of GPC 4 been afforested. However, since 2016 the percentage of GPC 3 has declined to 70%. GPC 5 (mainly broadleaves) has historically been the second most popular category, at approximately 20% during 2004 to 2011.

Since, the introduction of distinct GPC categories for native woodland establishment in 2015 there has been a steady increase in the area of new native woodlands established. Between 2019 and 2021, there was a 20% increase in the area participating in native woodland establishment GPCs.

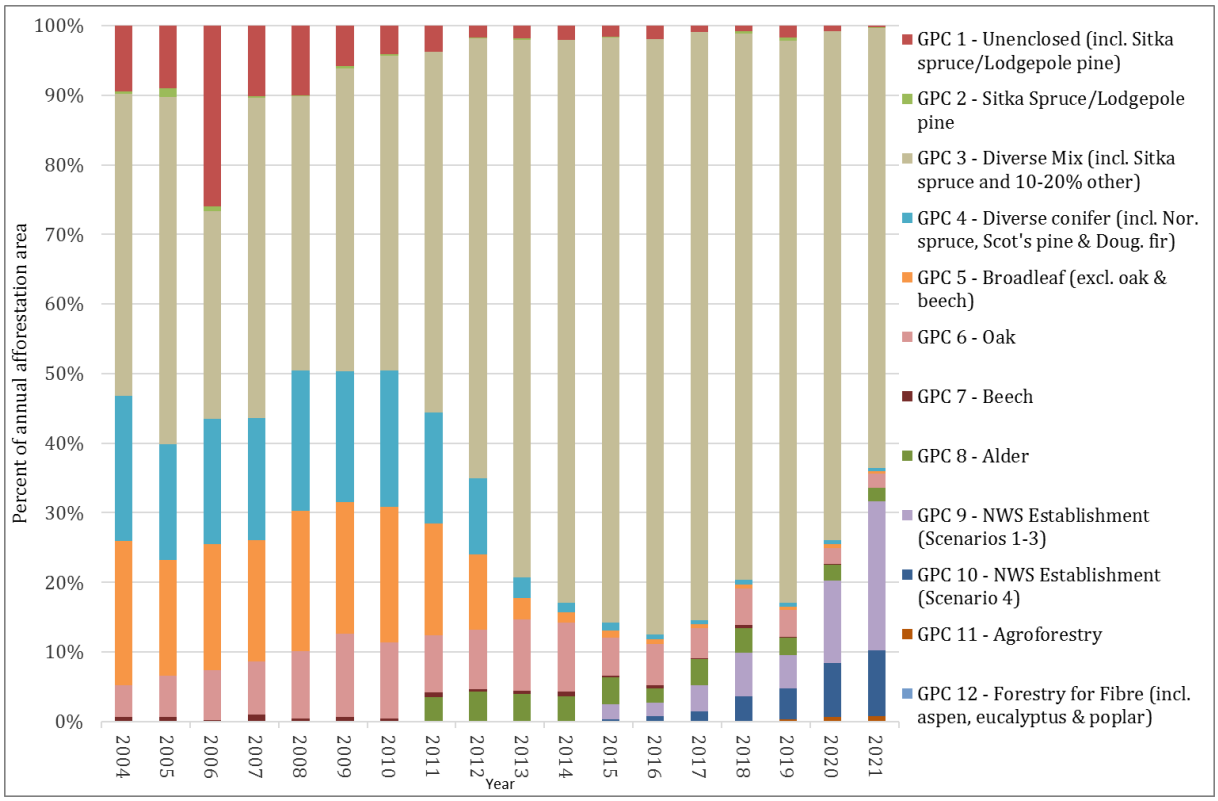

Figure 11: Proportion of annual grant-aided afforestation area by Grant Premium Categories (2004 to 2021)

3.4 Afforestation scheme applications

There has been a gradual decline in the uptake of the afforestation scheme since 2013. The comparison of three statistics overtime allows the level of demand for the afforestation scheme to be assessed (Figure 12).

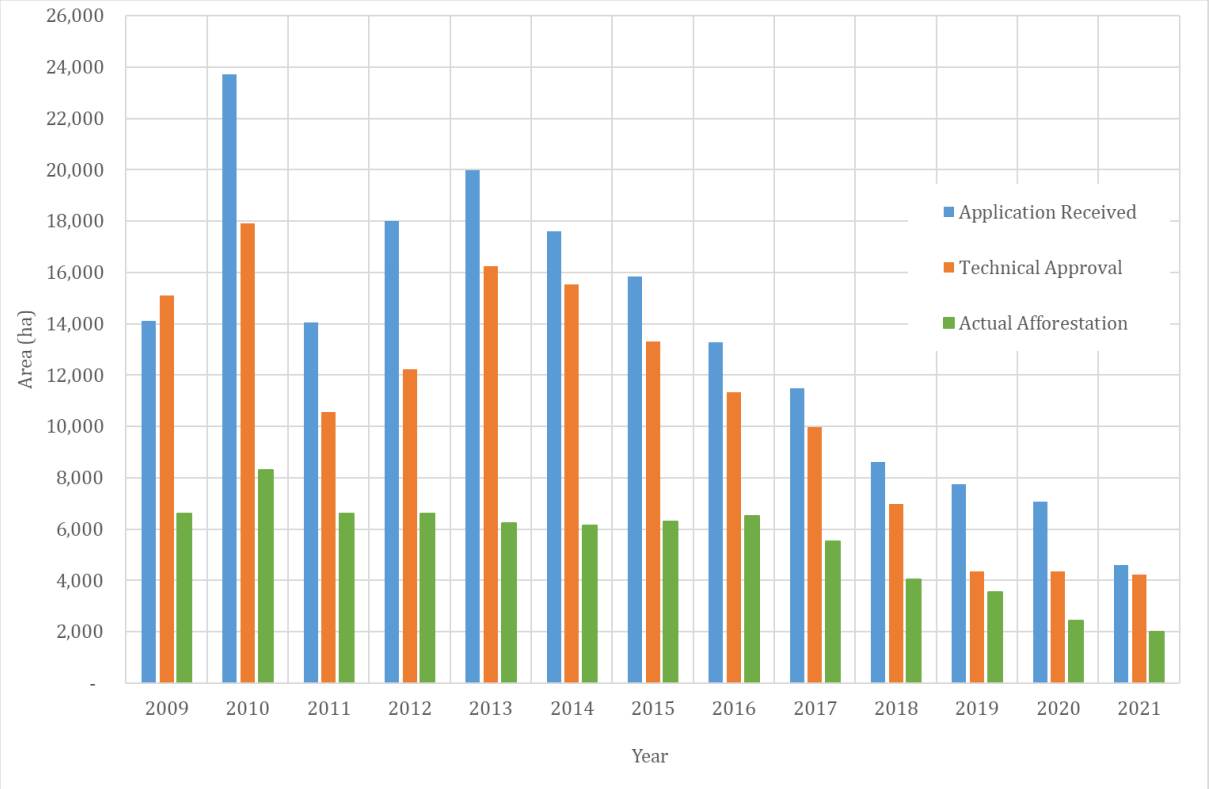

Figure 12: Area of Applications Received, Technical Approvals and actual afforestation

3.5 Grant-aided forest removal

The area of private grant-aided forest removed from the afforestation scheme is shown in Table 9. The majority of these removals are for the following reasons: Public utilities (e.g. power lines) and Commercial Developments (e.g. windfarms).

Table 9: Grant aided forest removal

Year	Number	Area (ha)	Mean Area (ha)
2007	47	67	1.4
2008	101	209	2.1
2009	110	147	1.3
2010	74	99	1.3
2011	68	87	1.3
2012	75	91	1.2
2013	63	70	1.1
2014	52	64	1.2
2015	13	36	2.7
2016	47	156	3.3
2017	40	101	2.5
2018	34	83	2.4
2019	19	39	2.0
2020	19	35	1.8
2021	17	57	3.3

3.6 Change of applicant

A substantial area of private grant-aided forests change ownership each year (Table 10). Most ownership change is within families from one generation to the next. All forest transfers are not reported, only those interact with DAFM regarding grant or annual premium payments.

Table 10: Change of applicant

Year	Number	Area	Mean Area (ha)
2007	345	3,385	9.8
2008	348	3,309	9.5
2009	374	3,850	10.3
2010	393	3,612	9.2
2011	335	2,970	8.9
2012	402	3,999	9.9
2013	379	3,440	9.1
2014	366	3,911	10.7
2015	362	3,503	9.7
2016	543	5,453	10.0
2017	395	3,350	8.5
2018	335	2,915	8.7
2019	404	3,722	9.2
2020	293	2,241	7.6
2021	278	2,107	7.6

3.7 County level statistics

The total afforestation by county for the last 20 years is detailed in Table 11. In 2021, Cork had the highest afforestation area at 343 ha followed by Roscommon with 190 ha. County level statistics detailing private and public afforestation are detailed in Table 12 and Table 13 respectively. County level species composition details (i.e. broadleaf/conifer) is presented in Table 14.

Table 11: Total Afforestation (ha) by County (2002-2021)

County	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Carlow	81	79	54	88	60	43	49	47	100	21	73	44	15	82	46	62	26	22	6	9
Cavan	716	220	436	303	217	300	197	260	243	204	171	210	241	277	425	317	321	167	185	160
Clare	1,012	590	833	749	698	669	695	564	521	484	480	347	420	568	552	518	262	352	168	174
Cork	2,094	978	1,434	1,734	1,441	1,024	1,006	799	1,157	1,035	1,041	672	690	663	608	420	297	423	293	343
Donegal	900	388	309	345	239	321	197	172	147	59	96	40	28	72	36	54	64	45	40	22
Dublin	5	19	11	-	-	18	11	-	-	1	20	-	12	8	3	11	4	35	13	0
Galway	660	452	527	499	372	403	263	318	561	300	336	419	387	432	331	400	287	279	96	144
Kerry	1,825	930	893	770	664	549	478	556	736	641	366	490	574	430	405	378	332	301	289	121
Kildare	154	134	84	129	84	79	17	111	86	141	220	48	90	29	13	33	79	25	32	42
Kilkenny	529	456	297	545	322	229	199	203	523	292	294	218	231	264	181	90	136	89	21	55
Laois	476	148	183	203	71	144	178	100	178	95	193	112	168	198	163	99	71	49	26	5
Leitrim	467	325	394	411	227	191	167	179	176	325	278	356	272	513	434	536	299	289	160	98
Limerick	1,175	807	767	684	521	373	441	329	411	381	281	243	122	177	329	99	81	156	66	60
Longford	416	212	255	208	255	124	86	87	243	174	178	255	225	286	272	201	171	62	124	70
Louth	63	8	18	2	20	55	65	65	46	19	51	26	-	22	40	22	10	1	2	0
Mayo	929	556	483	359	325	402	344	474	548	289	293	346	453	455	429	532	256	239	208	119
Meath	169	149	150	217	287	42	89	130	252	90	203	192	67	73	105	122	106	51	33	44
Monaghan	47	59	74	59	107	70	56	88	140	70	107	93	137	38	89	61	87	59	31	17
Offaly	309	386	316	262	218	135	242	324	279	268	263	174	128	156	136	166	72	76	38	25
Roscommon	503	462	575	287	322	309	352	398	360	311	252	431	449	343	435	431	399	315	273	190
Sligo	315	242	237	254	172	205	132	233	82	87	180	354	382	268	302	190	139	119	106	92
Tipperary	893	710	633	1,087	663	546	465	455	532	494	486	410	330	341	305	162	128	158	12	32
Waterford	482	231	220	239	308	310	156	245	264	204	128	138	122	125	240	163	43	49	46	33
Westmeath	276	209	320	351	155	141	145	200	203	251	271	241	236	204	281	207	175	77	45	49
Wexford	158	225	187	247	216	178	102	182	426	308	201	229	160	128	89	114	60	59	77	15
Wicklow	402	122	48	65	71	89	115	128	100	109	188	164	219	139	251	148	121	49	46	98
Total	**15,054**	**9,098**	**9,739**	**10,096**	**8,037**	**6,947**	**6,249**	**6,648**	**8,314**	**6,653**	**6,652**	**6,252**	**6,156**	**6,293**	**6,500**	**5,536**	**4,025**	**3,550**	**2,434**	**2,016**

Table 12: Private Afforestation (ha) by County (2002-2021)

County	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Carlow	81	79	54	88	60	43	49	47	100	21	73	44	15	82	46	62	26	22	6	9
Cavan	700	220	436	303	217	300	197	260	243	204	171	210	241	277	425	317	321	167	185	160
Clare	1,009	588	800	736	698	669	695	564	521	484	480	347	420	568	552	518	262	352	168	174
Cork	2,026	963	1,432	1,734	1,441	1,024	1,006	799	1,157	1,035	1,041	672	690	663	608	420	297	423	293	343
Donegal	861	388	292	330	230	321	197	172	147	59	96	40	28	72	36	54	64	45	40	22
Dublin	5	19	11	0	0	18	11	0	0	1	20	0	12	8	3	11	4	35	13	0
Galway	634	382	494	477	356	403	235	318	561	300	336	419	387	432	331	400	287	279	96	144
Kerry	1,825	914	893	770	664	549	478	556	736	641	366	490	574	430	405	378	332	301	289	121
Kildare	154	134	84	129	84	79	17	111	86	101	186	48	90	29	13	33	79	25	32	42
Kilkenny	529	456	297	545	322	229	197	203	523	292	294	218	231	264	181	90	136	89	21	55
Laois	464	148	183	203	71	144	178	93	178	95	193	112	168	198	163	99	71	49	26	5
Leitrim	452	319	388	411	227	191	167	179	176	325	278	356	272	513	434	536	299	289	160	98
Limerick	1,175	807	763	684	521	373	441	329	411	381	281	243	122	177	329	99	81	156	66	60
Longford	405	212	255	208	255	124	86	87	243	174	178	255	225	286	272	201	171	62	124	70
Louth	63	8	18	2	20	55	65	65	46	19	51	26	0	22	40	22	10	1	2	0
Mayo	904	554	483	359	325	402	344	474	544	289	293	343	453	455	429	532	256	239	208	119
Meath	169	149	150	217	287	42	89	130	252	90	203	192	67	73	105	122	106	51	33	44
Monaghan	47	59	74	59	107	70	56	88	140	70	107	93	137	38	89	61	87	59	31	17
Offaly	309	386	316	262	218	135	242	324	279	268	263	174	128	156	136	166	72	76	38	25
Roscommon	437	451	559	272	322	309	315	370	360	288	252	431	449	334	435	431	399	315	273	190
Sligo	305	242	226	254	172	205	132	233	82	87	180	354	382	268	302	190	139	119	106	92
Tipperary	868	710	633	1,087	663	546	465	455	532	494	460	410	330	341	305	162	128	158	12	32
Waterford	482	231	220	239	308	310	156	245	264	204	128	138	122	125	240	163	43	49	46	33
Westmeath	276	209	320	351	155	141	145	200	203	251	271	241	236	204	281	207	175	77	45	49
Wexford	158	225	187	247	216	178	102	182	426	308	201	229	160	128	89	114	60	59	77	15
Wicklow	398	116	48	65	71	89	115	128	100	109	188	164	219	139	251	148	121	49	46	98
Total	**14,735**	**8,969**	**9,617**	**10,032**	**8,011**	**6,947**	**6,182**	**6,613**	**8,310**	**6,591**	**6,592**	**6,249**	**6,156**	**6,284**	**6,500**	**5,536**	**4,025**	**3,550**	**2,434**	**2,016**

Table 13: Public Afforestation (ha) by County (2002-2021)

COUNTY	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Carlow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cavan	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clare	3	2	34	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cork	68	15	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Donegal	40	-	17	14	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galway	26	69	33	22	16	-	28	-	-	-	-	-	-	-	-	-	-	-	-	-
Kerry	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kildare	-	-	-	-	-	-	-	-	-	39	34	-	-	-	-	-	-	-	-	-
Kilkenny	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Laois	11	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-
Leitrim	15	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Limerick	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Longford	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Louth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mayo	24	3	-	-	-	-	-	-	4	-	-	3	-	-	-	-	-	-	-	-
Meath	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Monaghan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offaly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roscommon	66	11	16	15	-	-	37	28	-	23	-	-	-	9	-	-	-	-	-	-
Sligo	10	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tipperary	25	-	-	-	-	-	-	-	-	-	26	-	-	-	-	-	-	-	-	-
Waterford	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Westmeath	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wexford	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wicklow	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	**319**	**128**	**122**	**64**	**25**	**-**	**67**	**35**	**4**	**62**	**60**	**3**	**-**	**9**	**-**	**-**	**-**	**-**	**-**	**-**

Table 14: Total Afforestation (ha) by County and Broadleaf/Conifer (2012-2021)

County	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
	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	Broadleaf	Conifer
Carlow	23	50	14	31	3	12	19	63	14	32	13	50	12	13	6	16	5	1	7	2
Cavan	49	123	58	152	50	191	57	220	89	336	69	248	69	252	37	130	73	112	63	98
Clare	91	390	58	289	65	354	106	461	73	479	64	455	69	193	61	292	41	127	57	117
Cork	345	696	185	487	182	508	148	515	111	497	82	338	70	227	99	325	122	171	153	191
Donegal	17	79	10	30	4	24	10	62	7	29	15	40	11	53	20	24	13	27	7	16
Dublin	9	11	0	0	2	10	2	7	1	1	4	7	1	4	5	30	2	12	0	0
Galway	109	228	93	326	103	283	115	317	56	275	92	308	91	196	64	215	27	69	51	93
Kerry	95	271	115	375	105	470	104	327	114	291	131	247	155	177	104	197	115	174	69	53
Kildare	91	129	27	21	49	41	5	24	4	9	23	10	25	54	13	11	26	6	19	22
Kilkenny	131	163	62	156	51	180	73	192	66	115	24	65	32	104	22	67	4	17	16	39
Laois	70	123	27	85	35	133	22	176	32	132	15	83	19	53	10	39	2	24	1	4
Leitrim	79	198	71	285	41	231	71	442	73	361	82	455	54	245	44	245	45	114	41	57
Limerick	78	203	51	192	26	96	24	152	65	263	11	89	20	61	41	116	21	44	31	29
Longford	37	141	54	201	50	175	88	198	45	227	29	172	35	136	15	47	27	97	14	56
Louth	16	35	20	7	0	0	18	5	5	35	20	2	6	4	1	0	2	-	0	0
Mayo	37	257	59	288	76	378	62	393	59	369	78	453	59	197	67	172	55	153	45	74
Meath	116	87	61	131	33	33	25	48	31	74	61	61	36	70	21	30	14	19	13	31
Monaghan	37	69	32	61	33	104	8	29	16	73	14	47	35	51	21	38	16	15	10	7
Offaly	96	167	32	142	28	100	29	127	30	106	50	115	19	53	24	53	8	31	13	12
Roscommon	56	195	67	364	69	380	60	283	82	353	75	356	84	316	63	252	76	197	57	133
Sligo	36	145	69	285	49	333	28	240	42	260	29	161	16	123	30	89	17	89	33	59
Tipperary	167	319	78	332	64	266	73	268	39	266	28	134	22	106	31	127	5	7	7	25
Waterford	39	90	25	113	36	85	26	99	36	205	25	138	9	33	7	43	17	29	14	19
Westmeath	104	167	106	136	81	155	44	160	102	179	55	152	58	117	32	45	33	13	30	19
Wexford	69	132	66	163	59	101	29	100	42	47	40	75	8	52	31	28	26	51	14	0
Wicklow	48	140	54	111	53	166	17	122	37	213	34	115	54	66	23	26	29	17	67	31
Total	**2,045**	**4,607**	**1,492**	**4,760**	**1,348**	**4,808**	**1,263**	**5,030**	**1,270**	**5,230**	**1,161**	**4,375**	**1,070**	**2,956**	**893**	**2,657**	**819**	**1,616**	**829**	**1,187**
Percent	**31%**	**69%**	**24%**	**76%**	**22%**	**78%**	**20%**	**80%**	**20%**	**80%**	**21%**	**79%**	**27%**	**73%**	**25%**	**75%**	**34%**	**66%**	**41%**	**59%**

4. Private afforestation ownership

This section provides information on the nature of private forest owners who afforested between 1980 and 2021. The data refers to the calendar year when the forest was planted.

Key statistics

- 81% of the forests afforested since 1980 have been planted by farmers;
- Since 1980, 23,491 individual private forest owners have received grant aid to establish their forests;
- Nearly half (46.4%) 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 forest holding.

4.1 Farmer/non-farmer

Farmers accounted for 81% of private lands afforested between 1980 and 2021 (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 premium payments. Prior to 2014 it was necessary for land owners to qualify as farmers to be eligible for an additional five premium payments. Farmers and Non-farmers are now eligible for the same duration of premium payments. The category 'Non-farmer' includes landowners who in general are not actively farming. However, it is important to note that the non-farmer category includes; retired farmers, family members of farmers who might have inherited land but who work outside of farming and other landowners who may have recently bought the land.

A feature of the period from 1980 to 1994 was the higher average forest parcel size planted by non-farmers (15 ha), compared to an average of 5 ha for farmers (Figure 14). The differential between farmers and non-farmers reduced from 1994 to 2014, to an average of 8.7ha for farmers and 6.7ha for non-farmers. From 2015 onwards the average size of forests established by farmers and non-farmers has converged, at 6.2ha for farmers and 6.9ha for non-farmers.

In Table 15, information is presented on the area afforested in each county by Farmers and Non-farmers.

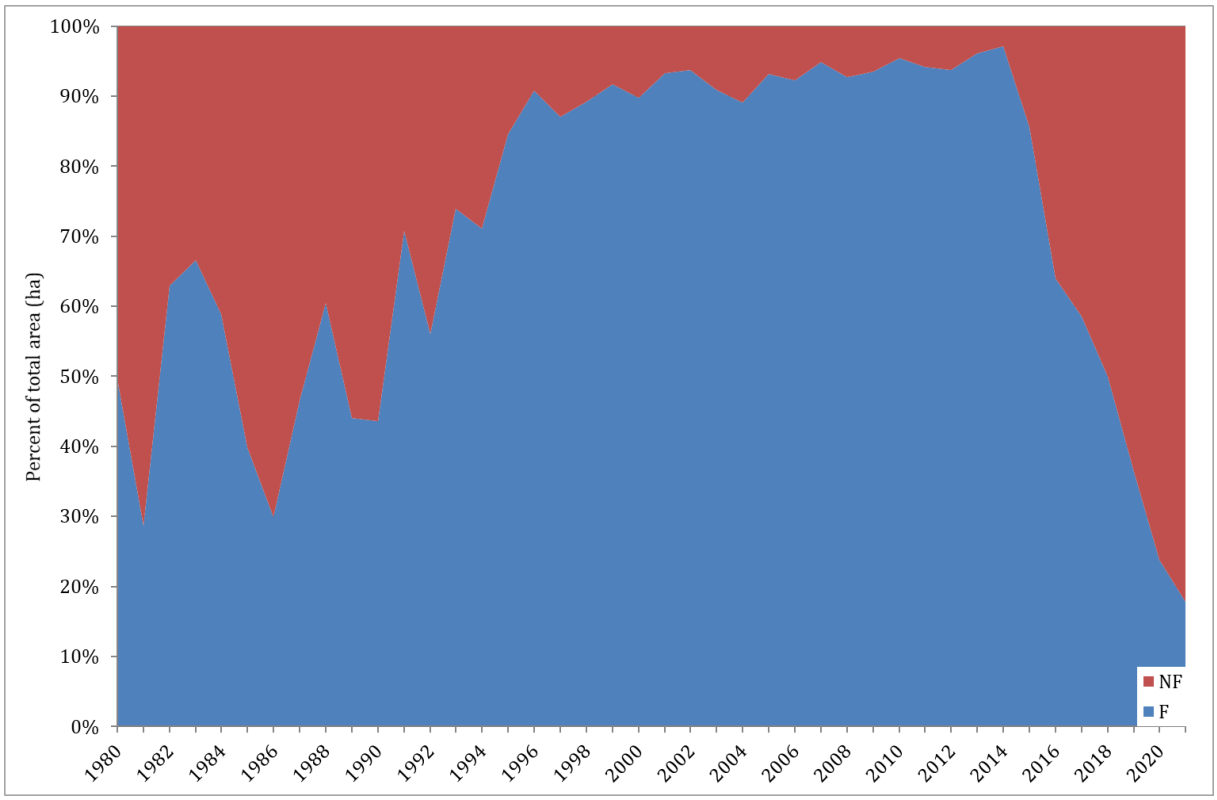

Figure 13: Farmer and Non-Farmer participation in afforestation (1980-2021)

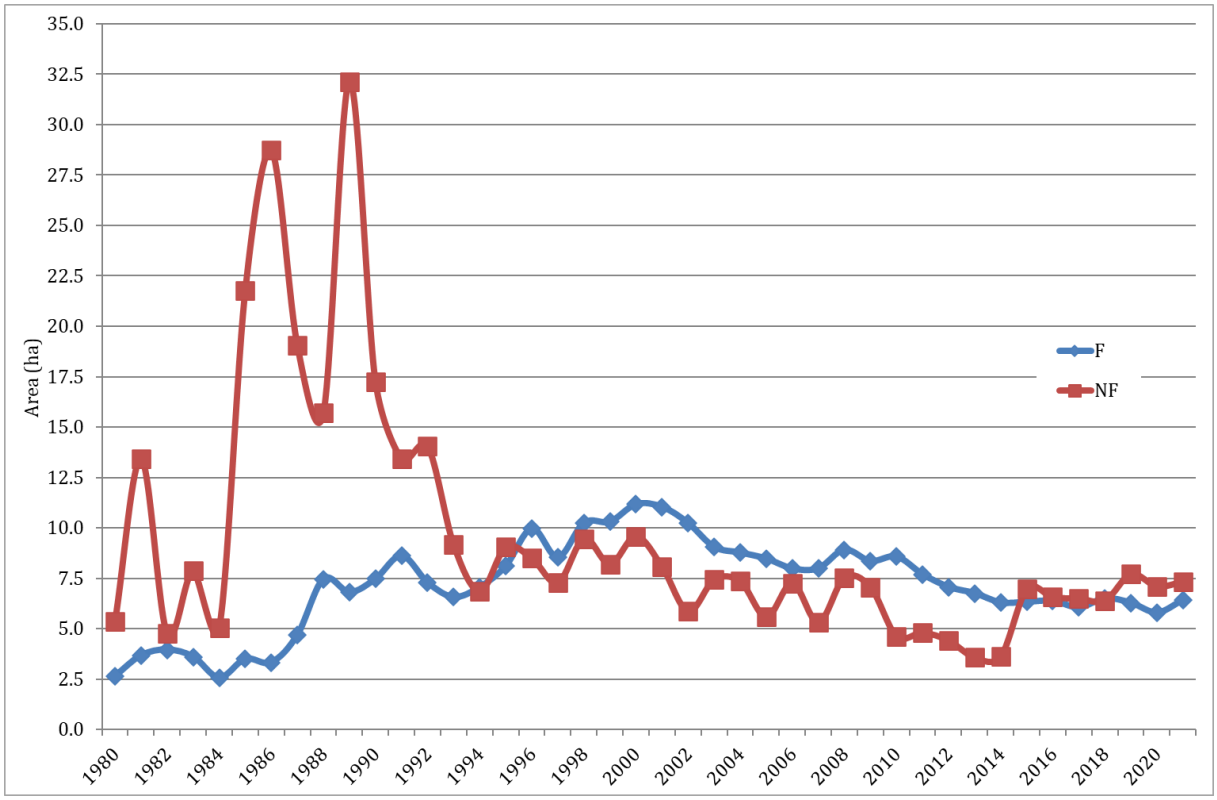

Figure 14: Average area of Farmer/Non-Farmer grant-aided afforestation (1980-2021)

Table 15: Total Afforestation (ha) by County and Farmer/Non-farmer (2015-2020).

County	2015				2016				2017				2018				2019				2020			
	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	9	82	-	-	5	17	4	28	8	46	2	16	5	22	1	4	2	21	1	1	1	4	1	2
Cavan	42	218	11	59	33	213	26	212	27	188	21	129	18	108	24	213	12	88	17	80	4	24	24	161
Clare	85	498	8	70	60	314	33	238	38	259	40	259	21	101	28	161	11	61	35	291	3	23	14	145
Cork	95	589	11	74	49	354	34	254	38	206	28	214	16	144	19	153	13	88	29	335	5	39	27	253
Donegal	10	47	5	25	6	28	2	8	4	28	4	26	4	15	5	49	2	4	6	40	1	6	5	33
Dublin	1	5	1	3	1	3	-	-	1	3	2	7	1	4	0	0	2	35	0	0	1	13	-	-
Galway	62	387	7	45	49	242	17	89	35	235	24	165	25	185	24	101	16	113	17	166	6	28	12	68
Kerry	48	359	10	72	51	285	20	120	29	164	31	214	20	175	22	158	18	132	30	169	5	20	39	269
Kildare	3	20	2	9	2	8	3	6	5	22	3	11	6	59	4	20	3	10	4	14	1	7	4	25
Kilkenny	38	208	4	56	19	132	7	49	16	89	1	1	16	121	3	15	12	69	6	20	4	18	2	2
Laois	11	173	2	26	15	111	11	52	7	62	7	36	7	46	4	25	3	14	3	35	1	5	2	21
Leitrim	58	416	10	97	34	239	28	195	37	271	33	266	14	117	27	182	7	42	25	248	11	75	9	84
Limerick	26	163	4	14	35	219	14	110	14	64	7	36	4	29	9	52	5	31	13	125	2	14	5	51
Longford	37	215	6	71	26	144	15	128	30	150	10	50	20	81	12	90	5	26	6	36	6	36	12	88
Louth	2	4	2	19	2	12	4	28	4	22	0	0	2	9	1	1	1	1	0	0	-	-	1	2
Mayo	72	424	8	31	53	316	22	113	51	252	33	280	24	98	33	158	10	70	28	169	5	22	30	187
Meath	12	60	2	13	11	64	9	41	9	60	12	62	9	62	5	44	5	36	4	16	-	-	6	33
Monaghan	8	24	2	14	9	46	6	43	4	39	5	23	7	37	7	50	4	37	2	23	3	12	6	18
Offaly	18	130	5	26	14	106	9	30	18	130	10	36	9	57	4	15	9	51	5	25	3	16	5	23
Roscommon	49	285	7	58	50	305	29	130	52	293	20	138	33	180	30	219	28	137	24	179	21	115	19	158
Sligo	31	233	6	35	43	200	15	102	23	116	13	74	12	67	13	72	7	38	13	81	4	21	13	85
Tipperary	49	301	8	40	19	186	13	120	10	67	17	94	8	94	6	34	11	76	8	82	1	8	2	3
Waterford	23	119	2	7	17	221	4	19	18	132	5	32	4	18	4	24	2	15	2	35	2	20	5	26
Westmeath	27	204	-	-	21	173	18	108	23	146	10	61	13	87	11	88	6	35	7	42	3	7	8	38
Wexford	23	109	4	20	14	67	5	22	20	90	8	24	4	32	5	29	5	36	5	23	3	32	6	46
Wicklow	13	118	3	21	14	151	9	99	15	108	7	40	7	60	14	61	7	27	3	22	4	14	4	32
Total	852	5,389	130	904	652	4,156	357	2,344	536	3242	353	2,294	309	2,009	315	2,016	206	1,292	293	2,258	100	579	261	1,855

4.2 Number of grant aided forests planted by individual

It has been common for individual forest owners to afforest more than one forest. Table 16 details the number of individual forest owners who have had one or more grant aided forests planted since 1980. Some 78.7% of owners have planted one forest, accounting for 54% of the overall area. While 21.3% of the individual owners had two or more grant aided forests planted, these forests accounted for 46% of the area.

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

Table 16: Private grant aided forests planted by individual owners (1980-2021)

No. of grant applications	Individual owners		Area	
	Number	%	ha	%
1	18,633	78.7	153,555	53.5
2	3,417	14.4	54,449	19.0
3	941	4.0	23,276	8.1
4	309	1.3	10,950	3.8
5	140	0.6	7,150	2.5
6-7	112	0.5	7,571	2.6
8-9	49	0.2	4,435	1.5
10-19	49	0.2	8,724	3.0
20-49	22	0.1	8,556	3.0
50+	5	0.0	8,119	2.8
Total	23,677	100	286,784	100

The number of individual owners that have afforested by county is detailed in Table 17. It should be noted that individual owners recorded in any one year may have subsequently planted again in the following years.

Table 17: Cumulative number of individual owners and area by county in 1980–2021

County	No. owners	Area (ha)
Carlow	231	1,866
Cavan	852	8,732
Clare	1,903	23,541
Cork	2,943	31,505
Donegal	963	15,833
Dublin	84	837
Galway	1,538	16,698
Kerry	2,188	29,822
Kildare	359	3,370
Kilkenny	857	9,683
Laois	562	7,222
Leitrim	840	12,152
Limerick	1,095	13,623

County	No. owners	Area (ha)
Longford	619	5,920
Louth	87	722
Mayo	1,793	20,007
Meath	461	4,650
Monaghan	311	2,081
Offaly	708	8,597
Roscommon	1,245	13,278
Sligo	898	9,359
Tipperary	1,506	18,974
Waterford	707	7,775
Westmeath	597	7,700
Wexford	686	5,748
Wicklow	618	7,088

4.3 Annual grant applications by individual 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, compared to using a simple average of afforestation areas. By 2021, the average cumulative area afforested by individual owners was 12.1 ha (Table 18), compared to the average afforestation area of 8.6 ha (Table 8). Looking only at the average size of individual afforestation areas ignores the fact that some owners have afforested multiple forest holdings over time (Figure 15).

Table 18: Annual grant applications by individual owners (1980-2021)

Year	No. of individual 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	659	1,789	12.7	11.4
1990	647	2,331	12.8	12.3
1991	764	3,058	9.5	11.8
1992	594	3,581	9.7	11.7
1993	938	4,410	8.8	11.3
1994	1,250	5,505	10.8	11.5
1995	1,356	6,628	12.0	12.0
1996	1,365	7,715	10.1	12.1
1997	1,163	8,603	10.0	12.2
1998	1,043	9,393	10.5	12.3
1999	1,037	10,188	11.3	12.5
2000	1,161	11,022	11.9	12.8
2001	1,248	11,968	11.4	13.0
2002	1,134	12,788	10.9	13.1
2003	1,005	13,468	9.6	13.2
2004	831	14,067	10.2	13.2
2005	1,186	14,912	9.4	13.2
2006	1,026	15,642	8.9	13.2
2007	759	16,175	7.8	13.1
2008	629	16,630	8.8	13.1
2009	695	17,158	9.2	13.1
2010	898	17,845	8.5	13.0
2011	862	18,534	7.7	12.9
2012	845	19,201	6.9	12.7
2013	939	19,917	7.1	12.6
2014	950	20,627	6.5	12.5
2015	863	21,269	7.0	12.4
2016	929	21,991	7.0	12.3
2017	818	22,604	7.0	12.2
2018	542	22,996	7.4	12.1
2019	395	23,278	7.9	12.1
2020	307	23,503	7.8	12.1
2021	228	23,677	8.1	12.1

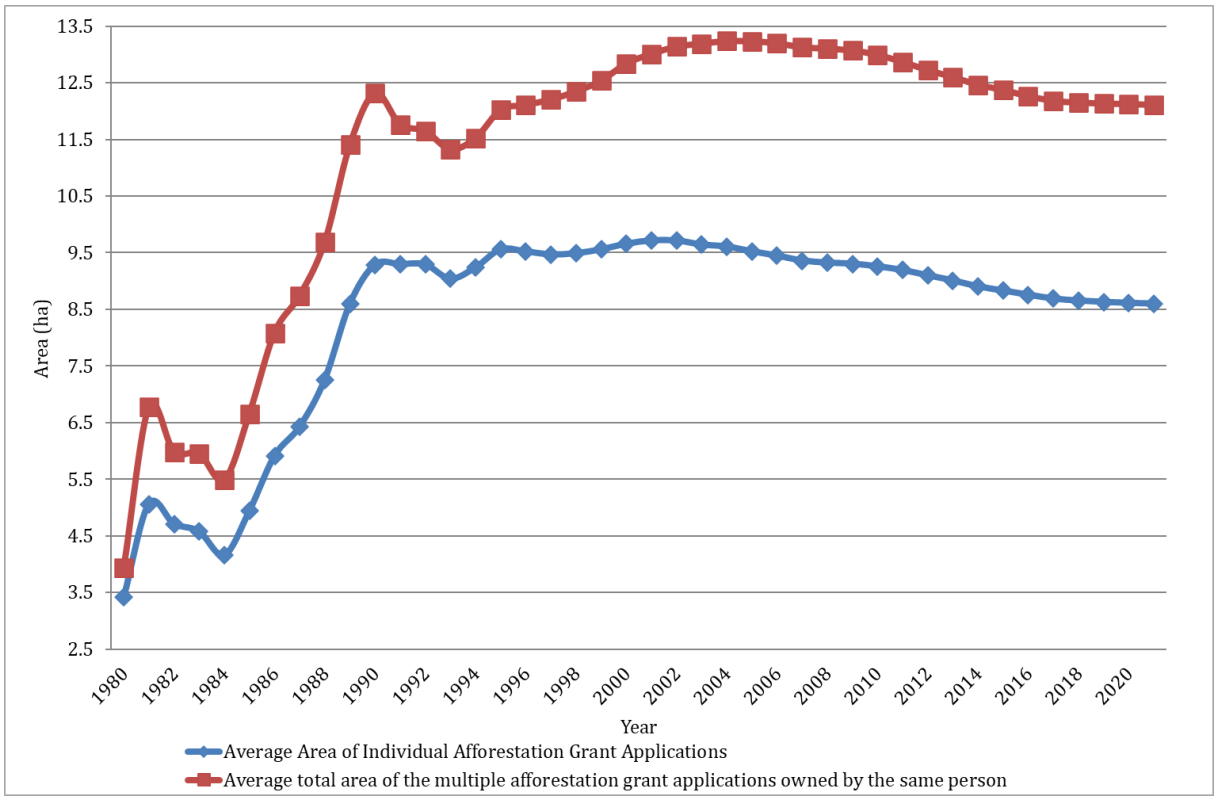

Figure 15: Average area of individual afforestation grant application vs. the average area of the combined multiple afforestation grant applications owned by the same person (1980-2021)

4.4 Age and gender profile of forest owners

In this section information is presented on the age and gender of forest owners. It is clear from Figure 16 that between 2006 and 2021, the age of entrants to the afforestation scheme has been increasing. In 2006, 28% of the area afforested was by people aged 60 years or more, and in 2021 this had increased to 57%.

Figure 17 details the age profile of the forest owners in receipt of premium. In 2021, 58% of the total area that received premium payments was owned by people aged 60 years or more.

Over the 15-year period (2006-2021) 83% of entrants to the afforestation scheme were male (Figure 18), which is in line with participation in other agricultural schemes in Ireland (e.g. Basic Payment Scheme). In 2021, 23% of entrants to the afforestation scheme were female, which was greater than average over the past 15 years of 17%.

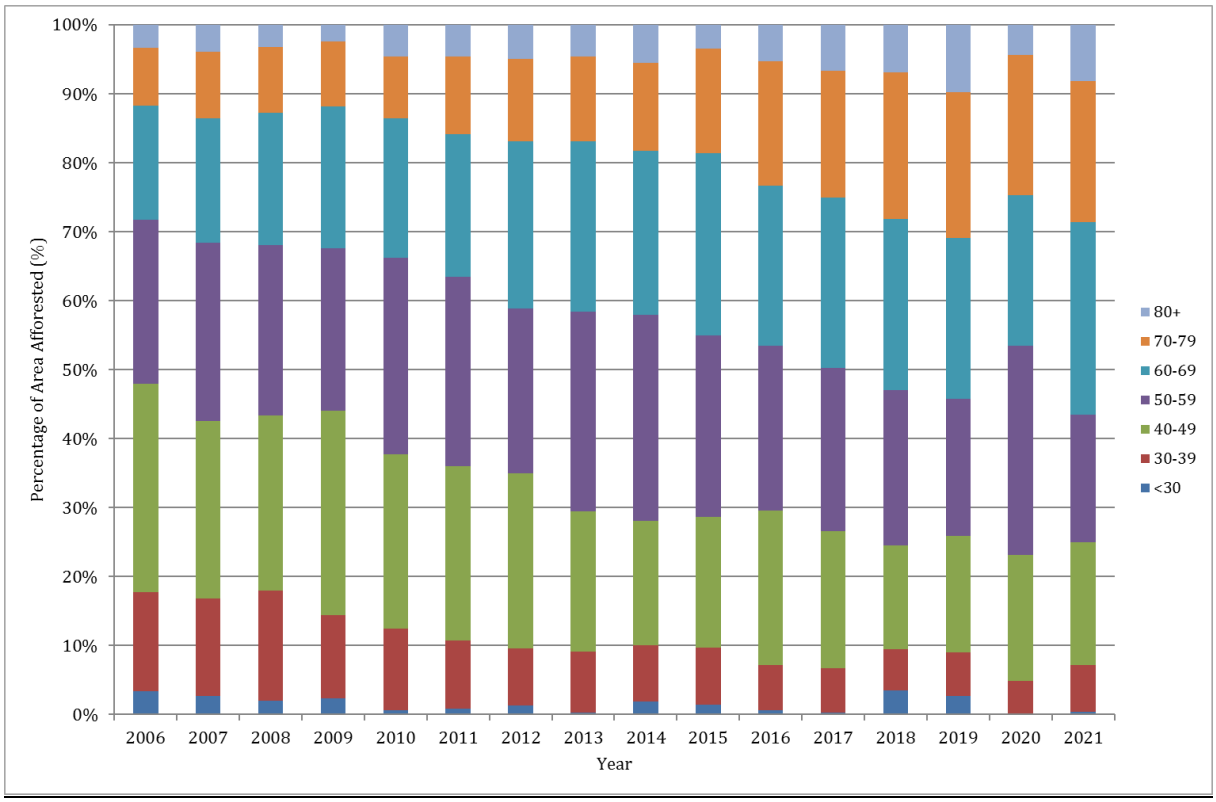

Figure 16: Age profile of forest owners at the time of when their land was afforested (2006 - 2021)

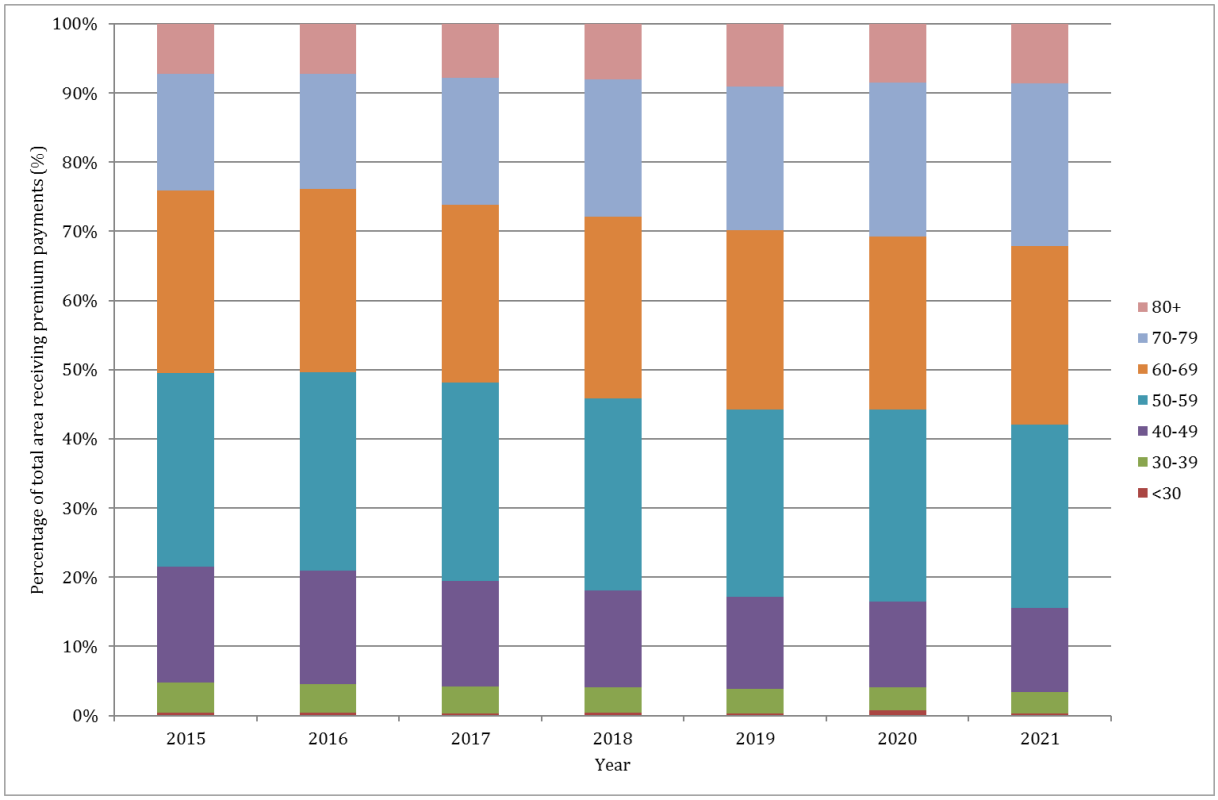

Figure 17: Age profile of forest premium recipients (2015-2021)

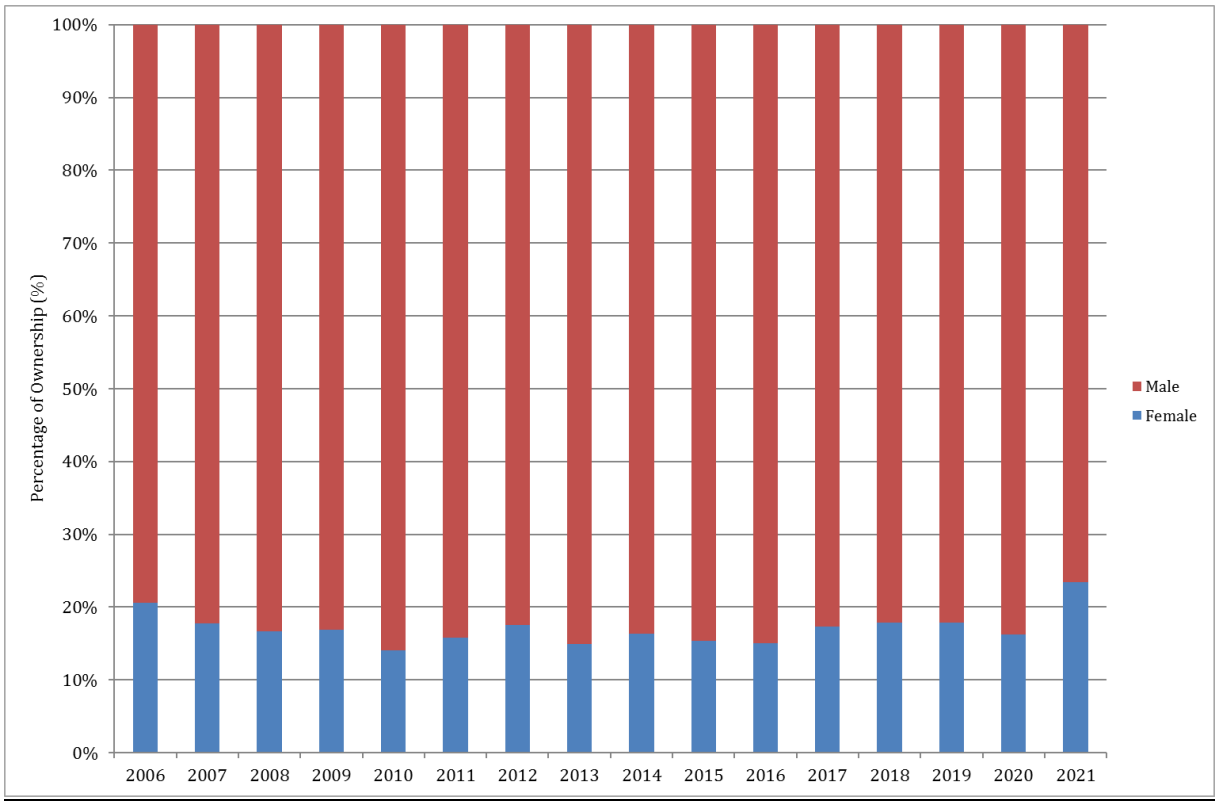

Figure 18: Gender of forest owners at the time of when land was afforested (2006-2021)

4.5 Private (non grant-aided) ownership details

Previous sub-sections in this chapter have outlined ownership profiles of the private grant-aided estate. Detailed information on the Private (non grant-aided) component of the forest estate is not available which comprised 121,786 ha in 2022 (NFI, 2022). The 1973 *Inventory of Private Woodlands*[22] 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 (non grant-aided) 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 20,000-30,000 individuals. 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 19.

Table 19: Inventory of Private Woodlands, 1973 - 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

[22] Purcell, T. 1979. *Inventory of Private Woodlands,* 1973, Department of Fisheries and Forestry, Forest and Wildlife Service.

5. Forest Management Operations

Key findings

- Since 1944 an average of 127 km of forest roads have been built annually in public forests;
- Between 2006 and 2021 an average of 89 km of private grant-aided forest roads were built annually;
- Over 8,463 ha were reforested on public lands in 2021;
- Public forest clearfelling amounted to 5,485 ha in 2021, while 8,825 ha of forest were thinned;

5.1 Forest Roads

Forest roads enhance the economic viability of forests primarily by improving access for harvesting and mobilising timber. In addition, forest roads also provide areas for the stacking of timber and for drying and chipping. 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.

5.1.1 Public forest roading

Between 1944 and 2021, 9,912 km of forest roads have been built in the public forest estate or on average 127 km annually (Figure 19).

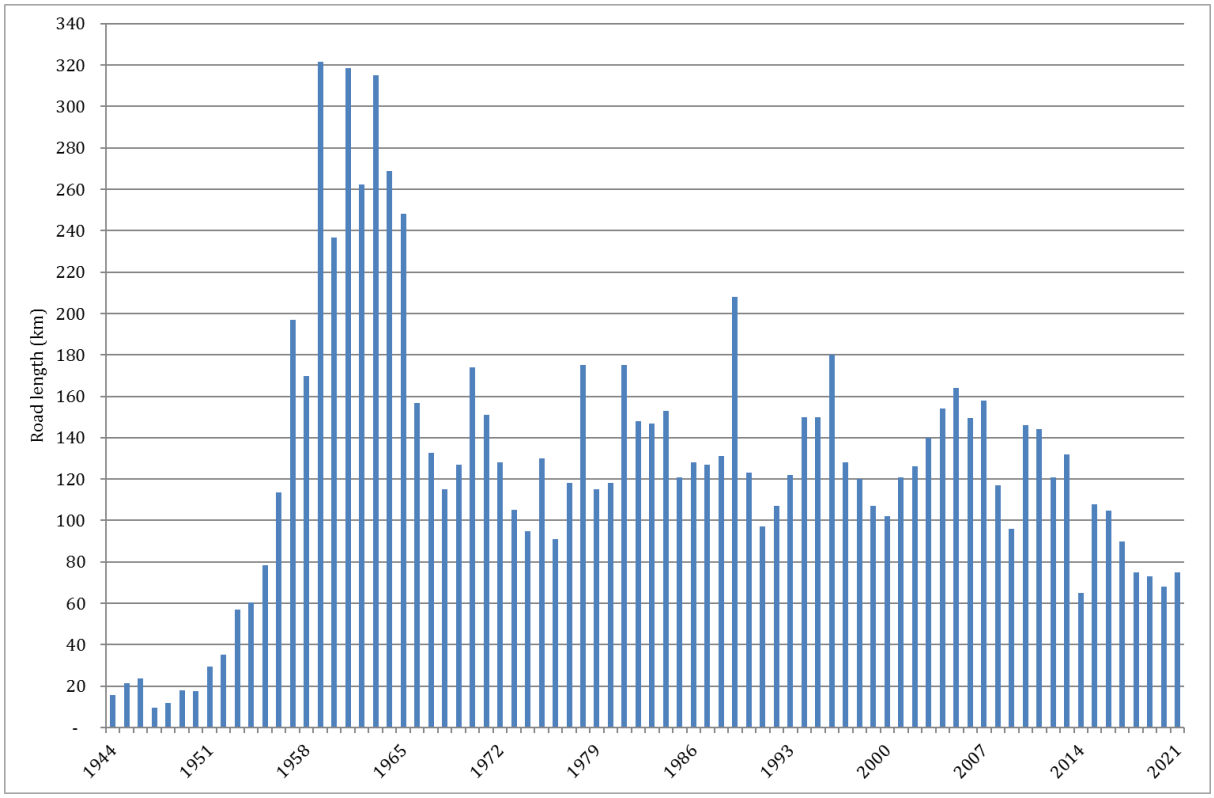

Figure 19: Forest road construction in public forests 1944–2021

5.1.2 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 20).

Since 2006, IFORIS[23] 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 2021, an average of 89 km of private grant-aided forest roads were built annually. Table 20 shows the private grant-aided forest road construction from 2011 to 2021 on a county level.

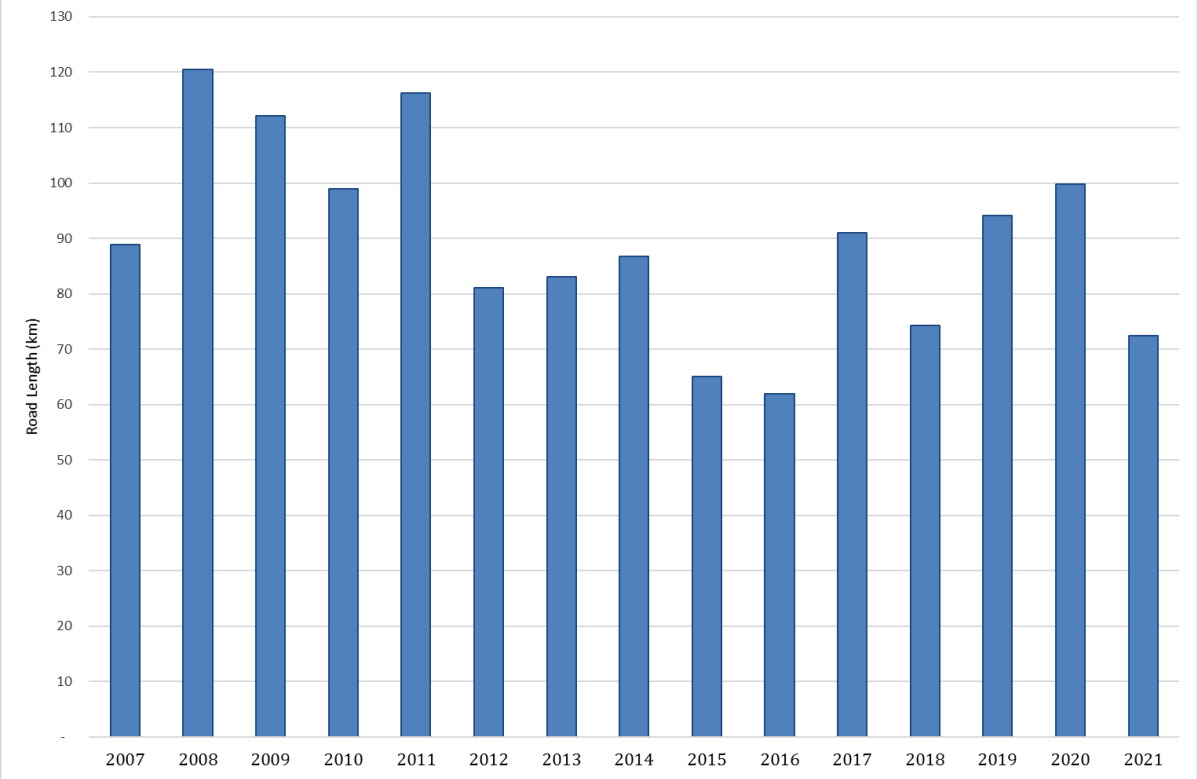

Figure 20: Private grant-aided forest road building (2007-2021)

[23] IFORIS is an Integrated Forest Information System which was developed for the processing of forestry pre-approval, grant and premium applications.

Table 20: Private grant-aided forest road building (metres) by county from (2011-2021)

County	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Carlow	494	60	883	0	0	798	470	210	348	261
Cavan	1,777	2,478	3,187	3,197	1,702	2,815	4,569	7,360	6,092	2,584
Clare	3,418	4,238	2,768	5,225	4,191	5,755	4,585	3,459	4,540	3,169
Cork	11,614	6,534	8,969	8,708	5,724	8,183	7,432	10,458	8,811	6,640
Donegal	80	0	1,376	402	395	2,969	2,689	1,819	2,119	1,638
Dublin	0	480	800	0	0	484	1,295	868	0	0
Galway	3,123	2,360	4,329	895	1,047	3,365	4,301	3,303	944	3,699
Kerry	6,037	10,937	11,755	7,833	4,084	12,261	10,558	9,717	9,721	10,213
Kildare	1,158	1,324	80	2,667	430	735	420	499	1,037	251
Kilkenny	6,894	8,984	5,664	3,630	2,226	2,842	5,691	7,118	4,201	6,470
Laois	6,412	3,812	739	2,206	3,153	3,668	2,300	1,282	2,587	823
Leitrim	2,750	5,049	6,426	2,173	1,460	1,624	2,569	5,135	7,920	1,301
Limerick	3,137	6,134	4,927	1,254	3,585	4,885	3,994	4,317	6,987	5,989
Longford	2,606	552	3,116	1,845	2,080	1,228	1,570	3,623	3,511	1,882
Louth	787	0	0	0	435	0	0	0	0	0
Mayo	3,355	2,000	3,480	942	266	1,105	1,047	2,329	2,563	2,655
Meath	1,105	2,791	384	2,593	1,514	1,734	1,028	2,818	660	856
Monaghan	200	170	0	50	899	1,372	2,454	475	179	919
Offaly	1,919	1,468	2,839	1,950	1,606	4,716	2,861	674	7,323	2,454
Roscommon	5,968	2,856	4,422	1,005	917	1,573	3,048	5,614	5,496	6,036
Sligo	2,286	2,805	5,354	2,693	1,813	1,134	1,312	1,909	2,609	781
Tipperary	5,243	7,847	6,051	7,331	10,253	8,898	3,674	6,293	6,204	4,381
Waterford	1,099	2,266	2,649	2,362	2,636	5,139	1,086	2,366	1,219	4,385
Westmeath	3,234	2,602	3,218	2,723	6,492	5,961	2,427	4,860	6,571	2,217
Wexford	1,692	882	1,121	1,292	2,759	4,083	290	2,812	2,019	2,178
Wicklow	4,723	4,455	2,148	2,140	2,278	3,730	2,546	4,820	6,155	718
Total	**81,111**	**83,084**	**86,685**	**65,116**	**61,945**	**91,057**	**74,216**	**94,138**	**99,816**	**72,499**

5.2 Felling Licences Issued

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 21 shows the area of lands granted felling licences for both thinning and clearfelling.

The area issued with felling licences for thinning was on an upward trend between 2010 and 2014, this declined by approximately 4,544 ha in 2015. This figure has subsequently increased, with 14,504 ha licensed for thinning in 2018. A large increase in the area licensed for clearfell was evident in 2014 due to Storm Darwin. The clearfell area licensed in 2016 declined to 1,384 ha, which is still high when compared to pre-Storm Darwin clearfell areas. In 2018, 4,421 ha were licensed for clearfell, reflecting plantations that were established during the late 1980's and early 1990's reaching maturity.

Information is also from provided for the public estate in Table 21 on felling licences. In 2011 and 2016, large areas were licensed for thinning which represent a multi-annual thinning programme.

It should be noted that the areas licensed for thinning and clearfell are indicative and may not be fully utilised on the ground due to a variety of reasons e.g. markets, access.

Table 21: Area (ha) of felling licences issued (2010-2021)

Year	Public		Private		Total	
	Thinning	Clearfell	Thinning	Clearfell	Thinning	Clearfell
2010	3,634	10,558	10,382	439	14,016	10,996
2011	109,789	15,134	12,275	590	122,064	15,725
2012	353	3,026	13,037	467	13,390	3,493
2013	301	6,170	15,150	394	15,450	6,564
2014	272	8,566	15,742	3,447	16,014	12,012
2015	5,717	9,571	11,198	2,012	16,916	11,583
2016	137,848	8,395	16,549	1,384	154,397	9,780
2017	10,281	7,980	16,697	2,133	26,977	10,113
2018	11,184	9,736	14,504	4,421	25,688	14,157
2019	38,242	5,936	9,328	3,690	47,571	9,626
2020	1	7,145	7,604	4,725	7,605	11,870
2021	0	12,431	12,494	8,278	12,494	20,709

5.3 Public forest thinning and clearfelling

The area of public forest clearfelled peaked in 2003, coinciding with a peak in domestic construction activity (Figure 21). Clearfell areas from 1986-2000 were estimated by averaging the reforestation areas for the two years following clearfell. Thinning activity in the public estate is shown in Figure 22. Thinning data for 1986-1996 are not available, but to create a complete time series an estimate of 10,065 ha has been assumed (i.e. average of a 10-year period 1981-1985 and 1997-2001).

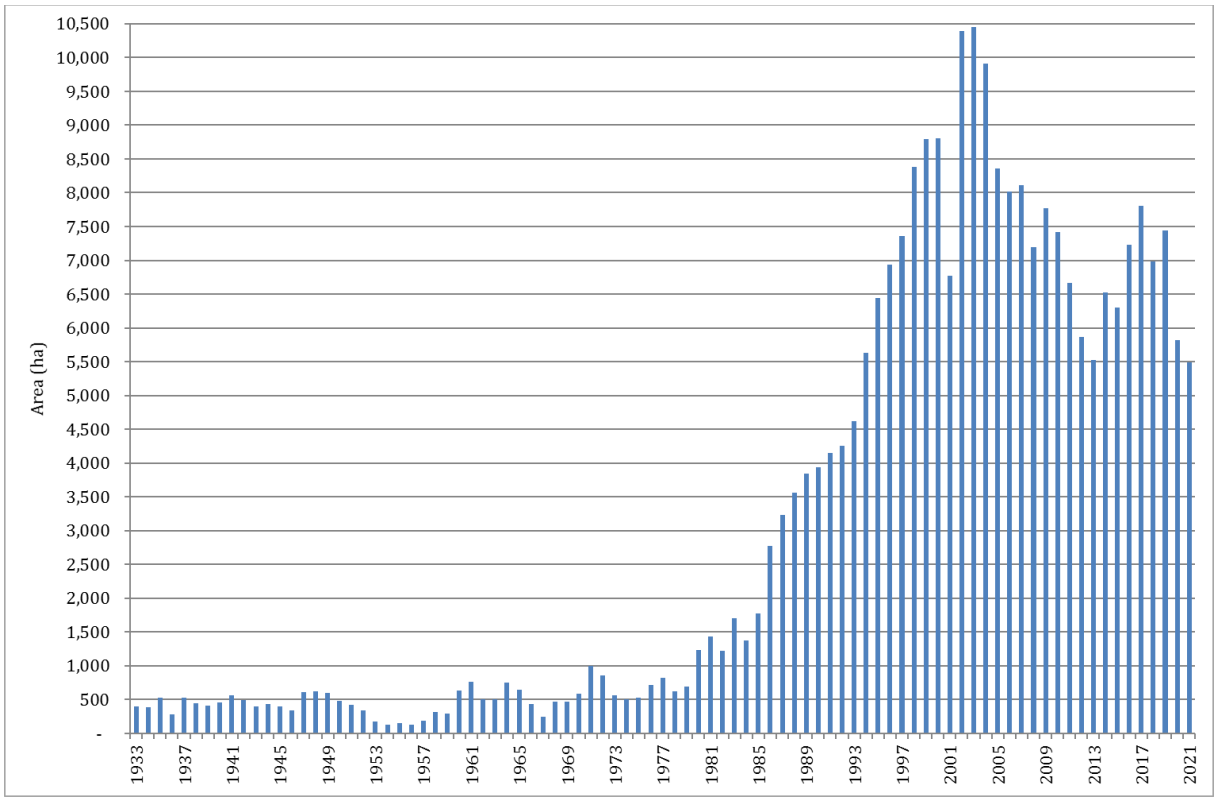

Figure 21: Public estate clearfelling 1933-2021

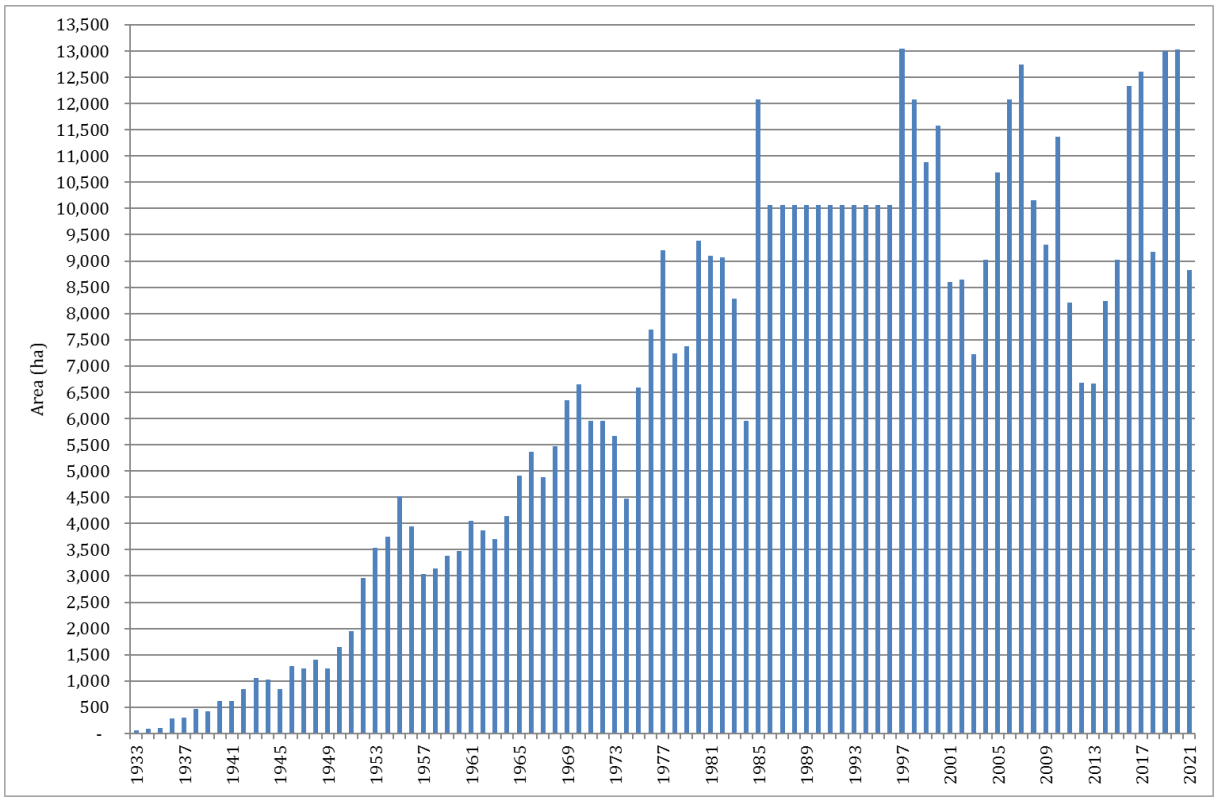

Figure 22: Public estate thinning 1933-2021

5.4 Public forest reforestation

Reforestation is the regeneration of existing areas of forests that have been felled, and 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 2021 are shown in Figure 23. Up until the early 1980's reforestation rates were low due to relatively low afforestation up to 1950. In the 1950's and 1960's afforestation greatly expanded, which in turn was reflected in the increasing reforestation of the 1980's and 1990's. By 2008 and 2009, the area of public reforestation had fallen by about a third, since a peak of 10,000 ha in 2003. In recent years the level of reforestation has significantly increased.

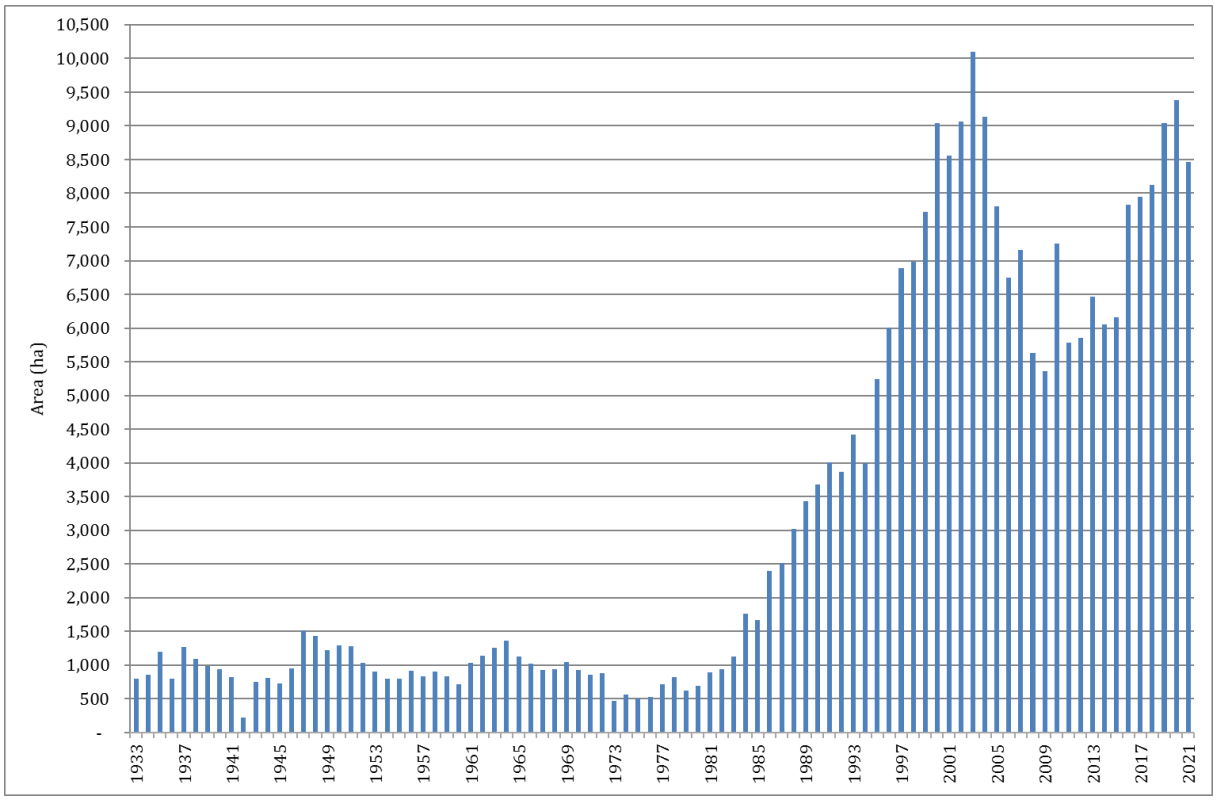

Figure 23: Public sector reforestation 1933-2021

5.5 Broadleaf Thinning and Tending

As part of the Woodland Improvement Scheme (WIS), 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 WIS was introduced in 2009. In total 7,298 ha have received payment to be tended or thinned between 2011 and 2021 (Figure 24). Ash has been the main species grant aided. Figure 25 shows the species areas grant aided. The year presented in both charts refers to the year when works were completed.

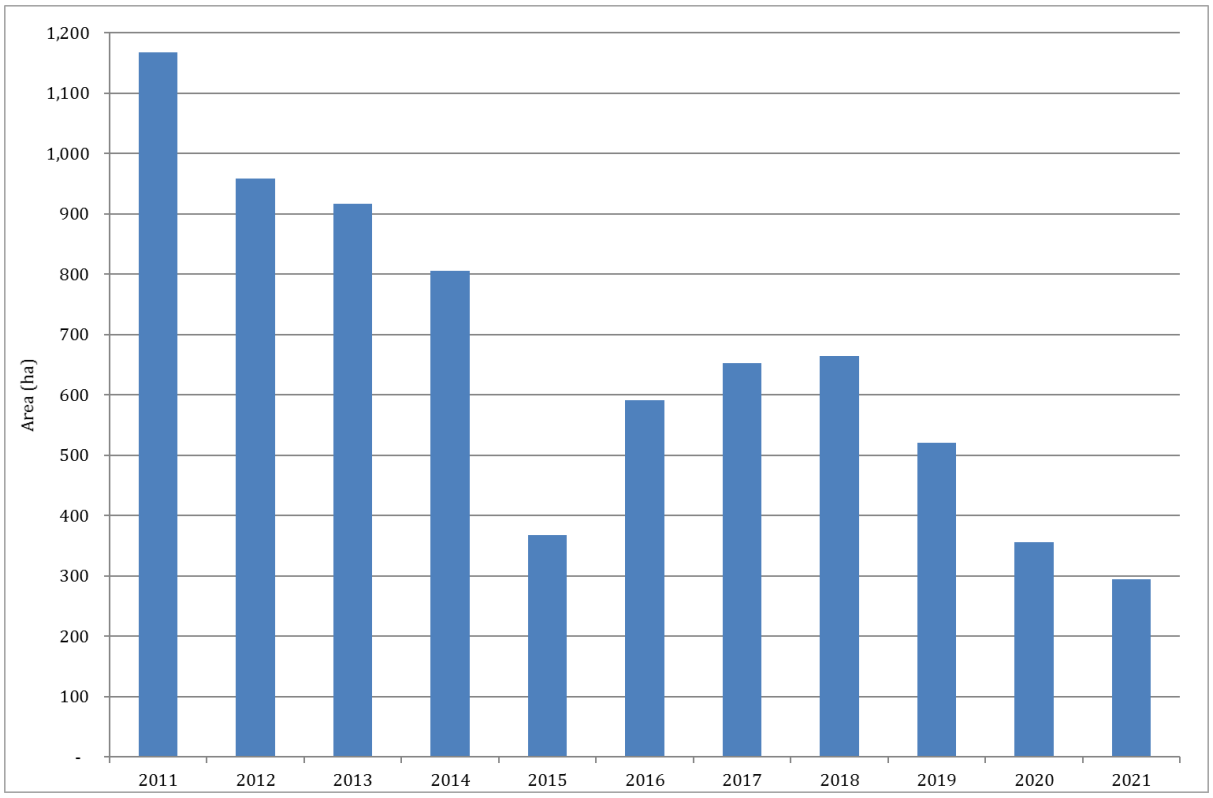

Figure 24: Total area tended and thinned under the Woodland Improvement Scheme 2011-2021

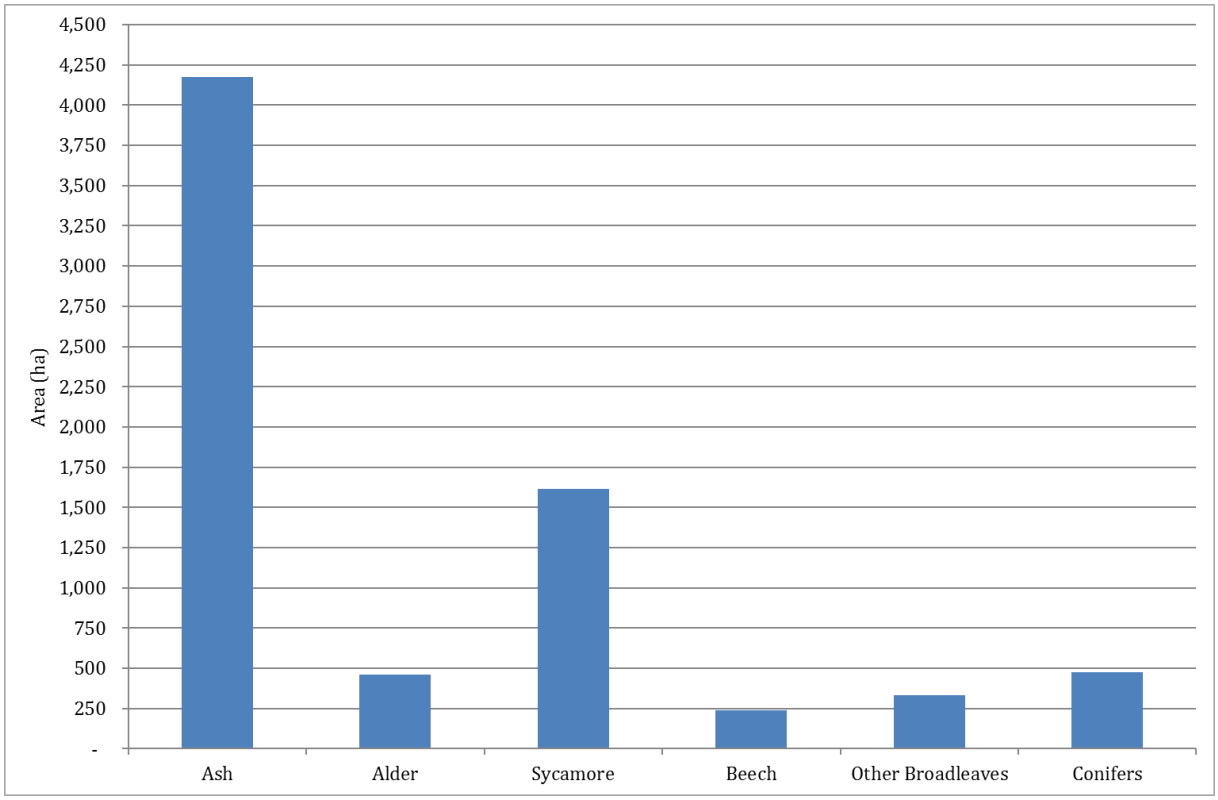

Figure 25: Species tended and thinned under the Woodland Improvement Scheme 2011-2021

4.6 Certification

Voluntary forest certification schemes are run by international non-governmental organisations to promote good forest practice. In Ireland, there are currently two certifying schemes: 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 management of the Coillte estate, which comprises 54% of the national forest estate, is certified by both the FSC and PEFC. Coillte first obtained certification in 2001 from FSC and became certified in 2014 when the company received PEFC certification.

As harvesting in the private sector increases, certification is likely to be an issue for private forest owners in the near future. Currently 15,845 ha of private forest is certified; of which 8,956 ha is certified by PEFC and 7,370 ha by FSC. There are 481 ha certified by both schemes.

5. Forest Production and Carbon

Key statistics

- The total roundwood harvest in 2021 (excluding firewood) was 4.33 million m^3;
- In 2021, 52% of the roundwood available for processing came from Coillte with the balance coming from the private sector;
- The share of private sector roundwood available for processing has increased from 8.2% in 2006 to 48.4% in 2021, reflecting the maturing private forest estate;
- The total forecast of net realisable volume production for the Republic of Ireland over the forecast period 2021-2040 is estimated as being 120.4 million m^3 overbark with an additional 13 million m^3 potentially available from Northern Ireland sources;
- Exports of wood and paper products were valued at €751 million in 2020 compared with a value of €1.8 billion for imports of wood and paper products in 2020;
- In 2020 the volume of roundwood input purchases by industry was three million cubic metres. This is a decrease of 3.9% compared with 2019 purchases of 3.1 million cubic metres;
- The national forest estate is an important carbon reservoir, amounting to 311.7 million tonnes of carbon in 2017;

6.1 CSO Forest and Wood Surveys

6.1.1 Roundwood Harvest 1955-2021

The national roundwood harvest (excluding firewood & hardwood) from Irish forests between 1955 and 2018 is shown in Figure 26. No data are available for the private roundwood harvest prior to 2006, however it was estimated that 100,000 m^3 was harvested from the private forest estate in 2000[24].

Up until the early 1980's, roundwood harvest was low due to relatively low afforestation rates up to 1950. The early 1980's saw the opening of the Finsa and Medite board mills which increased demand for roundwood and sawmilling residues. In 2021 4.33 million m^3 of roundwood was harvested in the Republic of Ireland, the highest levels since records began. Data from 2015 to 2021 was obtained from the CSO[25].

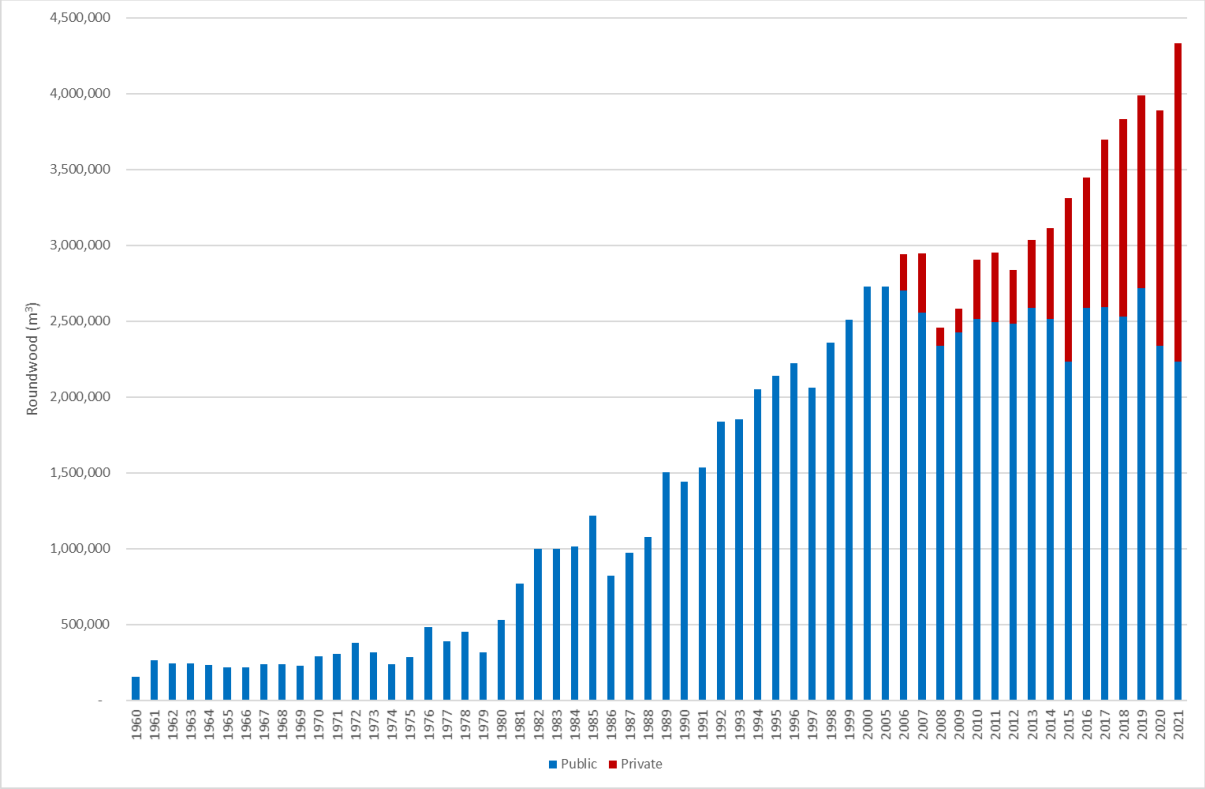

Figure 26: Roundwood harvest 1955-2021

6.1.2 Forest Wood Removals

The annual national roundwood available for wood processing, excluding firewood, is shown in Table 22. In 2021, 4.33 million m^3 of roundwood was removed from Ireland's forests for processing (excluding firewood) in the Republic of Ireland, an 31% increase compared to 2015 production. Much of this increase came from the private sector roundwood production with a 35% increase in 2021 production compared to 2020. Between 2015 and 2021, roundwood production from privately owned forests averaged 1,323,000 m^3. This is reflective of the maturing private forest estate.

[24] *Forecast of Roundwood Production from the Forests of Ireland 2001-2015*, (2001). COFORD, Dublin.
[25] Data prior to 2015 was sourced from Woodflow reports produced by Coford. From 2015-2021 data was available from: https://www.cso.ie/en/statistics/environmentstatistics/forestwoodremovals/

Table 22: Roundwood Total Removals by Product ('000 cubic metres) (2015-2021)

Product	Roundwood Total Removals			Roundwood Removals by Product					
	Public	Private	Total	Large sawlog	Small sawlog	Stakewood	Pulpwood	Fuelwood	Roundwood for use as biomass
2015	2235	1077	3,312	1,016	1,000	119	1,015	103	58
2016	2590	856	3,445	1,092	1,069	126	944	91	124
2017	2592	1106	3,698	1,210	1,163	136	1,018	100	70
2018	2529	1305	3,834	1,276	1,131	128	1,108	112	79
2019	2720	1267	3,987	1,242	1,121	145	1,195	112	172
2020	2336	1555	3,891	1,487	972	142	1,012	226	51
2021	2235	2098	4,333	1,749	1,120	129	1,094	209	33

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, and the increased export market share gained by sawmills. More information from Table 22 and Table 23 is available from the CSO[26].

Non-coniferous removals which are mainly commercial hardwoods are still a minor element of the annual roundwood available for processing, the figure had decreased substantially between 2018 and 2019, but has risen again to 26,000 m^3 by 2021 (Table 23).

Table 23: Non-coniferous Removals by Product 2015-2020

Product	Large sawlog	Small sawlog	Stakewood	Pulpwood	Fuelwood	Roundwood for use as biomass	**Total**
2015	-	1,000	-	-	5,000	-	**6,000**
2016	-	1,000	-	-	8,000	-	**9,000**
2017	-	1,000	-	-	14,000	-	**16,000**
2018	-	3,000	-	-	13,000	-	**15,000**
2019	1,000	2,000	-	-	9,000	-	**12,000**
2020	3,000	4,000	-	4,000	11,000	1,000	**23,000**
2021	4,000	5,000	1,000	5,000	10,000	1,000	**26,000**

6.1.3 Wood Input purchases by Industry

In 2020 the volume of roundwood input purchases by industry was three million cubic metres (Table 24). This is a decrease of 3.9% compared with 2019 purchases of 3.1 million cubic metres. Large sawlog accounted for the highest proportion of roundwood purchase volume at approximately 39% in 2020, followed by small sawlog (27%) and pulpwood (27%). More information is available from the CSO[27].

Table 24: Total Roundwood Purchases by Product 2020 ('000 cubic metres)

Product	Roundwood Purchases			Roundwood Purchases by Product				
	Public	Private	Total	Large sawlog	Small sawlog	Stake-wood	Pulp-wood	Roundwood for use as biomass
2015	2019	703	2722	967	710	47	843	154
2016	2191	607	2798	1037	722	49	794	196
2017	2166	712	2878	1066	751	50	829	182
2018	2149	791	2940	1158	738	49	852	143
2019	2397	740	3137	1065	889	53	954	176
2020	2093	921	3014	1167	822	36	809	179

[26] https://www.cso.ie/en/statistics/environmentstatistics/forestwoodremovals/
[27] https://www.cso.ie/en/statistics/environmentstatistics/woodinputpurchasesbyindustry/

6.1.4 Wood and paper Exports and Imports

Exports of wood and paper products were valued at €751 million in 2020 compared with a value of €1.8 billion for imports of wood and paper products in 2020 (Table 25). In recent years, export volumes of Coniferous industrial roundwood, Coniferous sawnwood, Veneer sheets and Wood-based panels, and Recovered paper have exceeded imports of these products. This is indicative of the maturing forest estate and the development of markets from the wood processing industry.

Table 25: Exports and Imports of Wood and Paper Products 2020

Category	Imports		Exports	
	Volume	€000	Volume	€000
Coniferous Industrial Roundwood	252,748	23,835	391,726	18,495
Non-Coniferous Industrial Roundwood	5,088	4,097	-	-
Wood Fuel	11,707	5,475	2,349	719
Other Biomass	148,633	34,940	119,098	10,791
Coniferous Sawnwood	393,536	82,245	662,373	144,578
Non-Coniferous Sawnwood	26,694	30,258	464	984
Veneer Sheets and Wood-based Panels	326,508	141,762	687,044	229,752
Pulp	-	52,909	-	0
Recovered Paper	-	3,458	-	40,346
Paper and Paperboard	-	274,752	-	24,377
Secondary Wood Products	-	472,930	-	99,296
Secondary Paper Products	-	665,454	-	181,952
Total	**1,164,914**	**1,792,114**	**1,863,055**	**751,290**

Figure 27 displays the exports of coniferous sawnwood which have increased by 212% from 212 thousand cubic metres in 1995 to 662 thousand cubic metres in 2020. Exports of coniferous industrial roundwood increased by 89% from 207 thousand cubic metres in 1995 to 392 thousand cubic metres in 2020. More information is available from the CSO[28].

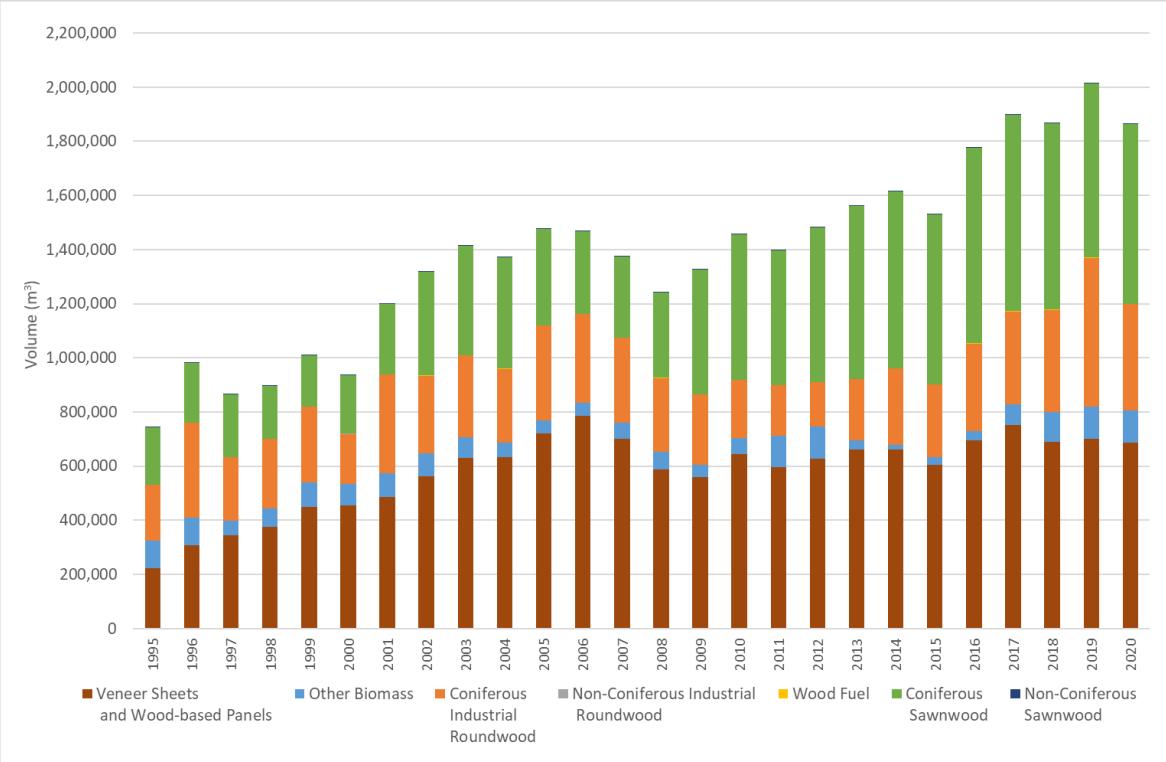

Figure 27: Volume of Exports of Wood and Paper Products 1995-2020

[28] https://www.cso.ie/en/statistics/environmentstatistics/woodandpaperexportsandimports/

6.2 Roundwood Forecast

6.2.1 Roundwood Forecast

The total forecast of net realisable volume production for the Republic of Ireland over the forecast period 2021-2040 is estimated as being 120.4 million m^3 overbark with an additional 13 million m^3 potentially available from Northern Ireland sources.

The annual forecast of net realisable volume will increase from 4.7 million m^3 in 2021 to 7.6 million m^3 by 2040 for the Island of Ireland. Table 26 displays the future sustainable harvest levels between 2021 and 2040 by ownership type and indicates that privately owned forests will steadily increase their share of the total harvest of roundwood in the Republic of Ireland from 35% in 2021 to 61% in 2040[24].

Table 26: Forecast of potential net realisable volume production by ownership type 2021-2040 (000 m^3 overbark)

Year	Republic of Ireland			Northern Ireland			All Ireland total
	Private	Coillte	Total ROI	DAERA FS	Private	Total NI	
2021	1,467	2,757	4,224	489	24	513	4,737
2022	1,742	2,757	4,499	489	24	513	5,012
2023	2,385	2,757	5,142	489	24	513	5,655
2024	2,408	2,757	5,165	489	24	513	5,677
2025	2,472	2,757	5,229	489	24	513	5,742
2026	2,750	2,560	5,309	554	46	600	5,909
2027	2,922	2,560	5,482	554	46	600	6,082
2028	2,925	2,560	5,484	554	46	600	6,084
2029	3,156	2,560	5,716	554	46	600	6,316
2030	3,499	2,560	6,059	554	46	600	6,659
2031	3,738	2,717	6,456	751	40	791	7,247
2032	4,042	2,717	6,759	751	40	791	7,551
2033	3,950	2,717	6,668	751	40	791	7,459
2034	3,963	2,717	6,680	751	40	791	7,471
2035	4,428	2,717	7,145	751	40	791	7,937
2036	4,177	2,703	6,880	663	39	702	7,582
2037	4,177	2,703	6,880	663	39	702	7,582
2038	4,177	2,703	6,880	663	39	702	7,582
2039	4,177	2,703	6,880	663	39	702	7,582
2040	4,177	2,703	6,880	663	39	702	7,582
Totals	**66,733**	**53,684**	**120,417**	**12,285**	**745**	**13,030**	**133,447**

[24] *All Ireland Roundwood Production Forecast 2021-2040*, 2021. COFORD, Department of Agriculture, Food and the Marine, Dublin.

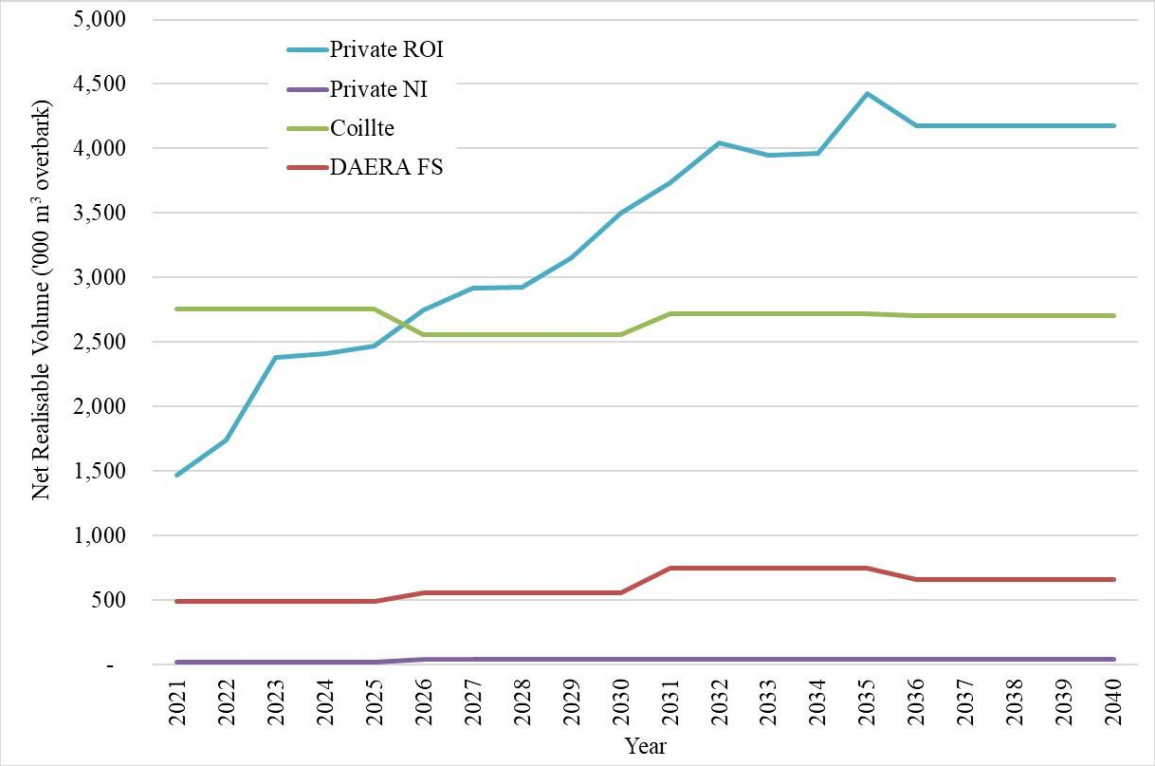

Figure 28: Forecast of total net realisable volume (2021 - 2040)

6.2.2 Harvest Area

In line with the decrease in thinning volume, there is a comparable drop in the area for thinning over the forecast period. The thinning area increases from an estimated 26,909 ha in 2021 to a peak of 35,605 ha in 2026. It is then forecast to decline to circa 25,000 ha for the period 2036-2040 (Table 27). The clearfell area increases steadily over the forecast period from 10,063 ha in 2021 to a peak of 18,368 ha in 2035. In Table 28 the relative accuracy of the roundwood forecast data from 2016 and 2021 is displayed by comparing forecast data with the annual roundwood removals from the intervening period.

Table 27: Conifer Harvest Area (ha) By Harvest Type (2021-2040)

Year	Private Sector ROI		Private Sector NI		Coillte		DAERA FS		Total	
	Thin	Clearfell	Thin	Clearfell	Thin	Clearfell	Thin	Clearfell	Thin	Clearfell
2021	9,079	3,245	60	54	16,448	5,863	1,322	901	26,909	10,063
2022	11,124	3,539	60	54	16,448	5,863	1,322	901	28,954	10,357
2023	12,577	4,914	60	54	16,448	5,863	1,322	901	30,407	11,732
2024	12,043	4,652	60	54	16,448	5,863	1,322	901	29,873	11,470
2025	13,100	5,105	60	54	16,448	5,863	1,322	901	30,930	11,923
2026	19,022	5,476	125	104	15,125	5,863	1,333	1,003	35,605	12,446
2027	16,030	6,081	125	104	15,125	5,863	1,333	1,003	32,614	13,051
2028	15,739	6,308	125	104	15,125	5,863	1,333	1,003	32,323	13,278
2029	15,955	7,006	125	104	15,125	5,863	1,333	1,003	32,538	13,976
2030	17,858	7,787	125	104	15,125	5,863	1,333	1,003	34,441	14,757
2031	17,438	8,995	125	90	14,634	5,863	1,189	1,429	33,386	16,377
2032	15,424	10,494	125	90	14,634	5,863	1,189	1,429	31,372	17,876
2033	15,261	9,620	125	90	14,634	5,863	1,189	1,429	31,209	17,002
2034	15,474	10,328	125	90	14,634	5,863	1,189	1,429	31,422	17,710
2035	14,957	10,986	125	90	14,634	5,863	1,189	1,429	30,905	18,368
2036	14,436	10,378	125	88	10,325	5,942	1,120	1,276	26,006	17,683
2037	12,843	10,000	125	88	10,325	5,942	1,120	1,276	24,413	17,306
2038	11,675	7,508	125	88	10,325	5,942	1,120	1,276	23,245	14,814
2039	12,663	6,958	125	88	10,325	5,942	1,120	1,276	24,233	14,264
2040	14,341	6,497	125	88	10,325	5,942	1,120	1,276	25,911	13,802
Total	**287,038**	**145,878**	**2,175**	**1,680**	**282,663**	**117,653**	**24,820**	**23,045**	**596,696**	**288,256**

Table 28: Comparison between the roundwood forecast and the annual roundwood removals

Product	Roundwood forecast			Roundwood Total Removals		
	Public	Private	Total	Public	Private	Total
2016	2,655	976	3,630	2,590	856	3,446
2017	2,694	914	3,608	2,592	1,106	3,698
2018	2,762	926	3,688	2,529	1,305	3,834
2019	2,844	1,158	4,003	2,720	1,267	3,987
2020	2,821	1,324	4,145	2,336	1,555	3,891
2021	2,757	1,467	4,224	2,235	2,098	4,333

6.2.3 Wood Fibre Availability for Wood Energy in the Republic of Ireland

Forests also provide a source of renewable raw materials and replace materials and energy produced from fossil fuels 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.

Based on the qualifying assumptions above, the potential wood fibre available for energy and other uses totals 34.78 million m^3 over the period of the forecast (Table 29). The volume increases steadily from 0.89 million m^3 in 2021 to over 2.0 million m^3 between 2031 and 2035 and thereafter decreases to 1.82 million m^3 in 2040.

Table 29: Forecast of Wood Fibre and potential for wood energy in the Republic of Ireland (2021-2040)

Year	Roundwood 7 - 13cm	Downgrade + Wood Residues	Harvesting Residues	Total	Energy Content Millions (GJ)
	000 m^3				
2021	184	589	113	886	**6.1**
2022	258	708	93	1,059	**7.3**
2023	348	1,005	112	1,465	**10.1**
2024	325	1,002	86	1,413	**9.8**
2025	357	1,013	95	1,464	**10.1**
2026	394	982	145	1,522	**10.5**
2027	396	1,052	164	1,612	**11.1**
2028	363	1,037	153	1,553	**10.7**
2029	405	1,129	145	1,679	**11.6**
2030	467	1,280	146	1,893	**13.1**
2031	505	1,416	91	2,011	**13.9**
2032	591	1,538	98	2,226	**15.4**
2033	496	1,492	86	2,074	**14.3**
2034	593	1,432	96	2,121	**14.6**
2035	528	1,683	96	2,307	**15.9**
2036	394	1,550	55	1,999	**13.8**
2037	371	1,540	47	1,958	**13.5**
2038	327	1,512	32	1,871	**12.9**
2039	310	1,497	35	1,842	**12.7**
2040	301	1,472	45	1,819	**12.5**
Total	**7,914**	**24,928**	**1,933**	**34,775**	**239.9**

6.3 Roundwood Prices

Statistics on the sale of firewood from public forests between 1937 and 1987 are shown in Figure 28. Firewood consumption peaked during the Second World War due to restricted coal imports. There was

6.3.1 Roundwood prices - Coillte

Coillte is currently 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 30 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. There is no data available for 2021.

Table 30: Coillte Average Standing Timber Prices (€/m³) by tree size category[26]

Category (m³)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0.001 - 0.074	-	-	10.5	-	-	-	-	39.4	-	-	
0.075 - 0.124	-	-	-	-	-	41.2	-	-	-	-	
0.125 - 0.174	-	8.5	9.5	-	-	-	-	40.1	-	-	
0.175 - 0.224	38.6	32.8	-	-	-	-	-	56.6	-	44	
0.225 - 0.274	47.6	39.5	40.9	43.7	49.2	50.0	43.5	44.2	66.4	51.8	58.4
0.275 - 0.324	43.8	42.3	43.2	47.1	52.4	49.9	45.8	46.0	62.4	55.6	64.7
0.325 - 0.374	44.1	43.7	44.5	51.3	54.5	53.9	44.7	51.8	70.5	54.3	63.3
0.375 - 0.424	58.2	44.4	46.8	48.6	57.3	56.5	48.1	51.1	67.8	53.7	60.9
0.425 - 0.474	55.5	47.2	45.6	52.0	58.6	58.4	50.5	50.6	75.0	57.3	69.9
0.475 - 0.499	55.1	46.0	48.5	54.5	62.1	62.9	54.4	52.1	73.9	63.9	61.6
0.500-0.599	59.9	48.3	50.5	51.6	62.2	63.3	54.5	55.2	70.0	61.5	64.5
0.600-0.699	63.7	49.0	52.9	55.4	67.2	66.0	57.2	57.1	76.8	57.3	68.6
0.700-0.799	58.8	49.9	54.1	55.6	65.7	59.6	57.0	57.6	81.9	65.3	60
0.800-0.899	57.1	50.7	52.8	57.4	71.8	67.9	58.7	56.8	76.5	61.8	65.7
0.900-0.999	56.0	51.3	54.0	60.7	66.4	67.0	58.4	57.4	80.7	67.6	66.7
> 1.000	59.6	51.3	53.8	54.0	74.3	71.1	60.8	60.3	76.7	65.6	69.8
Average (€/m³)	**53.7**	**43.2**	**45.9**	**52.7**	**61.8**	**60.5**	**52.8**	**52.6**	**73.2**	**58.4**	**64.5**

[26] *Forestry & Timber Yearbook 2022*. Irish Timber Growers Association, Dublin.

6.4.2 Roundwood Prices - Private Sector

The UCD Forestry Section and the Irish Timber Growers Association (ITGA) collate timber price information from private sources, publishing it in the *Forestry and Timber Yearbook* annually. The prices are averages derived from small sales data received from a range of growers and therefore prices presented in Table 31 below are for guidance purposes only. The prices presented in Table 31 pulpwood prices from the private sector. There is no data available for 2021.

Table 31: Annual private standing roundwood prices (€/m³) 2010-2020[27]

Category (m³)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0.001 - 0.074	10.5	10.6	10.2	9.44	14.04	13.17	7.7	9.39	12.5	14.3	27.8
0.075 - 0.124	14.4	14.3	14.3	12.8	13.53	16.33	11.4	12.15	15.05	16.7	20.8
0.125 - 0.174	17.4	13.5	19.2	18.96	18.4	19.55	14.9	12.26	18.88	23.78	32.6
0.175 - 0.224	22.9	15.8	17.8	20.44	28.72	20.79	17.9	20.67	24.37	26.6	37.3
0.225 - 0.274	35.3	23.1	25.1	18.62	33.14	30.75	17.1	19.64	34.75	42.28	48.9
0.275 - 0.324	47.1	36.9	32.9	21.84	34.06	33.59	28	27.51	38.71	33.18	
0.325 - 0.374	64.1	57.5	38.6	47.42	39.64	34.32	26.7	43.36	36.15	50	62.9
0.375 - 0.424	56.7	52.3	28.4	44.48	49.03	43.32	39.3	41.87	49.07	28.32	47.2
0.425 - 0.474	54.2	53.3	48.3	32	65.93	39.21	49.4		58.61	46.13	47.1
0.475 - 0.499	53	35	-	-	-	-	-	48	53.1	54.07	48
0.500 - 0.599	57.1	50.3	49.2	45.05	61.85	47.56	44	51.31	58.52	57.17	48.8
0.600 - 0.699	54.3	51.7	51.8	45.99	56.82	58.99	58.8	49.4	58.3	61.24	52.1
0.700 - 0.799	54.3	52.6	54.7	53.79	64.21	59.53	49.4	52.74	52.34	47.98	51.6
0.800 - 0.899	53.7	50.4	54.9	53.35	67.72	59.54	49.8	50.71	59.57	56.16	49.8
0.900 - 0.999	52.9	53.4	54.8	51.26	65.16	64.74	57.5	53.75	57.97	58.09	50.8
1.000 and over	56.9	45	54.2	52.97	60.38	61.5	60.9	54.04	58.61	60.59	49.9

An additional source of information on the range of prices paid for privately owned timber during 2021 is the IFA Timber Price Survey (Table 32). The prices paid for timber varied significantly, for example the pulp prices quoted ranged from €26 to €44/tonne, depending on distance to market, access to the site and the size of the sale. The prices for sawlog varied from €95 to €127/tonne, which represents an increase compared to the previous surveys.

Table 32: IFA Timber Price Survey November – December 2021 (Price € /tonne roadside excl. vat)[28]

Product Type	Length (m)	Diameter (cm)	Price (€)
Pulp	3 m	< 7cm	26-44
Stakewood	1.6 m	> 8cm < 15 cm	42-75
Palletwood	2.5 m	> 14 cm	40-63
	3.1 m		60-79
	3.4 m		74-80
	3.7 m		70-82
Sawlog	4.9m	> 20cm	95-117
	5.5 m		114-127

[27] *Forestry & Timber Yearbook 2022*. Irish Timber Growers Association, Dublin.
[28] Available from: https://www.ifa.ie/market-reports/timber-price-surveys/

6.4 Firewood production

Statistics on the sale of firewood from public forests between 1937 and 1987 are shown in Figure 28. Firewood consumption peaked during the Second World War due to restricted coal imports. There was also increasing firewood demand during the 1980's, reflected in increased sales during this period. Official estimates of firewood use are unavailable between the years 1988 and 2005.

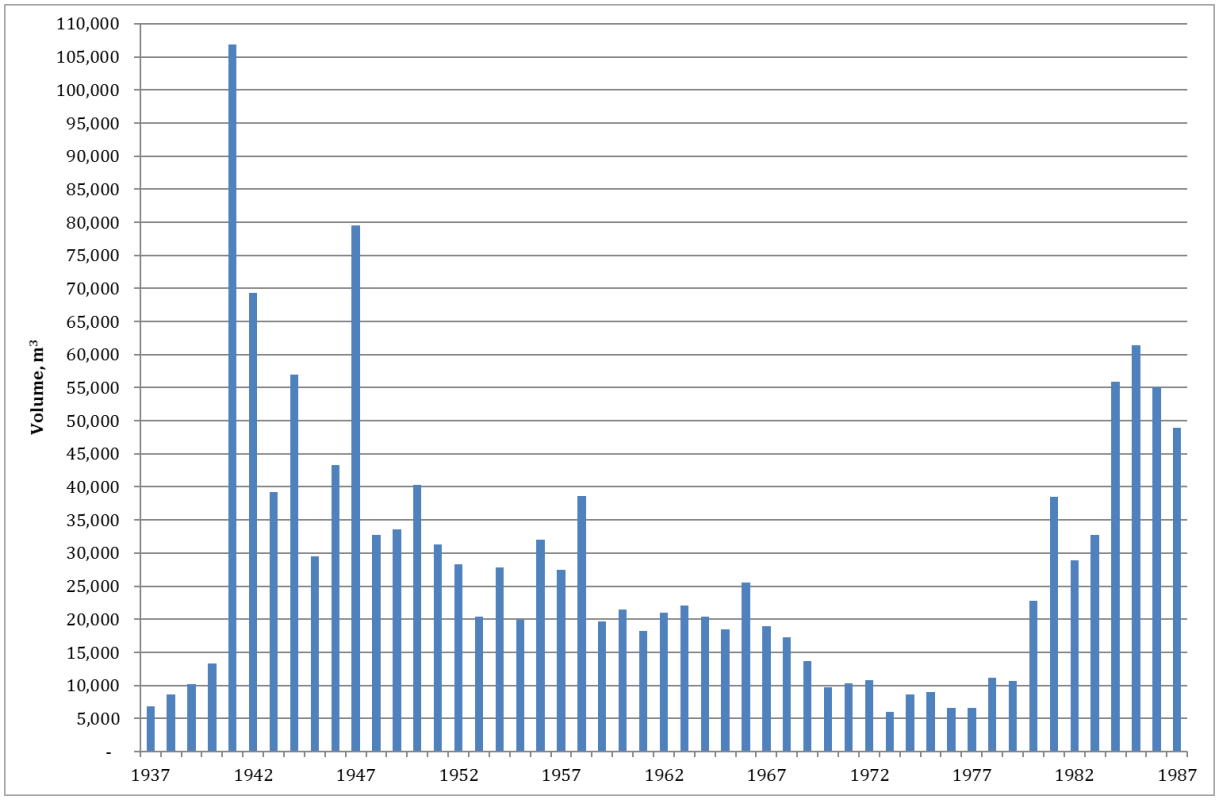

Figure 29: Firewood production volume from public forests 1937-1987

Residential energy use grew by 18.3% (0.4% per annum) over the period 1990–2015. Corrected for weather, the growth was 10%. During this time the number of households in the State increased by 74%, from approximately 1.0 million to 1.75 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[29].

Despite this, due to the significant increase in the number of households and energy usage per household there has been a concurrent increase in firewood sales since the 1980's. Between 2006 and 2018 the firewood market in Ireland has grown by 63%, from 147,000 m^3 in 2006 to 284,000 m^3 in 2020. Figure 30 shows firewood use in Ireland between 2006 and 2020 from State and private forests, including wood sourced from non-forest areas. From 2006 to 2014, firewood information was used from Woodflow[30], from 2015 to 2020, CSO[31] information on total roundwood removals for fuelwood and roundwood for use as biomass were used.

[29] *Energy in Ireland 1990–2015, 2016 Report*, 2016. Sustainable Energy Authority of Ireland.
[30] Woodflow and forest-based biomass energy use on the island of Ireland, 2018. COFORD, Department of Agriculture, Food and the Marine.
[31] Data prior to 2015 was sourced from Woodflow reports produced by Coford. From 2015-2020 data was available from: https://www.cso.ie/en/statistics/environmentstatistics/forestwoodremovals/

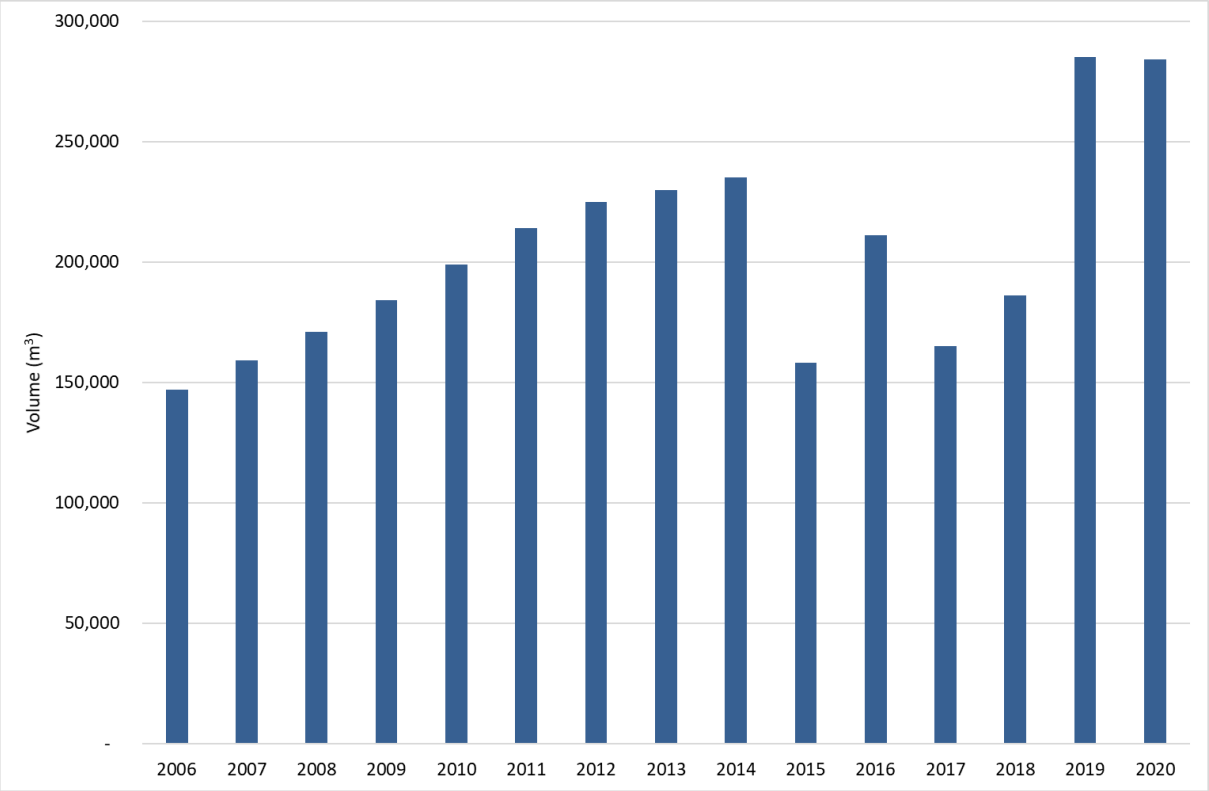

Figure 30: The domestic firewood market 2006-2020

The introduction of grant aid in 2009 for first thinning of broadleaf forests 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 this is not accounted for in current figures. Initiatives such as *The Wood Fuel Quality Assurance (WFQA)* scheme for Ireland administered by the Irish Bioenergy Association (Irbea) increases consumer confidence in wood fuel products sold in Ireland. The WFQA independently certifies and verifies suppliers of firewood, wood pellets, woodchip and wood briquettes. All certification is carried out against EN ISO 17225 standards for biomass fuels. Since 1st January 2022, all wood burning stoves must comply with the Ecodesign European directive in a bid to tackle air pollution and particulate emissions. Firewood at 20% moisture content produces less than 33% of the emissions of wood fuel at 30% moisture content when burned in older stoves. However, if firewood is burned in modern Eco-Design stoves the emission levels are reduced by almost 90%. Firewood will continue to provide an important market for forest owners in the thinning of forests.

5.6 Carbon stocks

Forests and forest products play an important role in mitigating climate change by sequestering and storing atmospheric carbon dioxide (CO_2). Sequestration is the net removal of CO_2 from the atmosphere, and storage in plant biomass, deadwood and harvested wood product pools. CO_2 is taken up during photosynthesis and stored as biomass. Some carbon is released back into the atmosphere due to autotrophic respiration and from the forest deadwood, litter and soils pool due to decomposition. Sustainably managed forests are a net absorber of carbon. However, unmanaged and degrading forests eventually become a net emitter of carbon back into the atmosphere. Large emissions can also occur during catastrophic disturbance events, such as fires

and windthrow. About half of carbon in harvested timber is stored in wood products (HWPs) but these carbon stores are eventually released back into the atmosphere. Use of wood for bioenergy replaces fossil fuel use and has the potential to reduce overall emissions. Fossil fuel emissions can also be reduced by substituting energy intensive materials with wood products (i.e. product substitution).

5.6.1 National Carbon Stocks

The national forest estate is an important carbon reservoir, amounting to 311.7 million tonnes of carbon in 2017 as estimated using data from the 3rd cycle NFI (Table 33). Carbon in biomass and litter pools have increased from 2012 to 2017. Since 2012, changes have arisen in the NFI methodology and biomass estimation techniques. More accurate biomass equations, new classification systems and associated C stock values were introduced for soil and deadwood, therefore the 2017 data are not comparable with the C stock estimates from 2006 and 2012.

The carbon stock in forest soils is the dominant component, accounting for 79.1% of the carbon in the forest estate in 2017. Total living tree biomass amounted to 17.9% of the total carbon stock, while deadwood, including logs, stumps and standing dead trees along with litter constituted the remaining 3%.

Table 33: Forest carbon stocks 2006, 2012 and 2017

	2006		2012		2017	
Carbon stock	Million t	% Total	Million t	% Total	Million t	% Total
Above-ground biomass*	30.6	8.9	39.7	10.4	45.6	14.6
Below-ground biomass**	6.7	1.9	8.8	2.3	10.3	3.3
Deadwood***	1.2	0.4	2.5	0.6	2.1	0.7
Litter	2.3	0.7	6.3	1.6	7.1	2.3
Soil	304.9	88.1	323.7	85.1	246.6	79.1
Total	348.4	100.0	381.0	100.0	311.7	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.*

5.6.2 Greenhouse emissions and removals from forests

Greenhouse gas emissions and removals are estimated using the CBM-CFS model based on data from the NFI, FAO-EUROSTAT data on harvested wood products (HWPs) and other data sources. The data presented in table 31 is taken from the National GHG inventory, which is submitted to the UNFCCC annually. Reporting also uses emission factors and activity data derived from national and international research, in accordance with IPCC good practice and UNFCCC rules, such as: carbon dioxide (CO_2) and non-CO_2 emissions from fires, drained organic soils and harvested wood products[32].

[32] Duffy, B. Hyde, E. Hanley, P. O'Brien and K. Black 2022. National inventory report Greenhouse gas emissions 1990 – 2020 Reported to the united nations Framework convention On climate change, EPA, Dublin.

Table 34: Changes in C fluxes for biomass, litter and deadwood and soil C pools and net CO_2 emissions from 1990-2020

Year	Carbon Stock Changes (Gg C) (removal is a positive value & an emission a negative value)							Overall Balance (Gg CO_2 eq.) (removal is a negative value & an emission a positive value)		
	Living biomass	Litter & Deadwood	Mineral soils	Organic soils	Fire	HWP	Total	CO_2	non-CO_2	Total
1990	1,166.9	85.8	-9.7	-463.0	-27.5	112.3	865.0	-3,171.6	216.1	-2,955.5
1991	1,180.7	92.6	-11.0	-479.5	-14.5	111.4	879.7	-3,225.6	218.5	-3,007.1
1992	1,005.3	126.0	-12.1	-495.6	-5.9	152.6	770.2	-2,824.2	221.2	-2,603.0
1993	1,139.4	29.5	-12.7	-508.7	-22.2	159.6	784.9	-2,878.0	234.0	-2,644.0
1994	1,034.3	59.5	-12.7	-525.8	-27.5	175.8	703.5	-2,579.6	242.6	-2,337.0
1995	946.2	87.3	-13.3	-552.1	-42.3	179.9	605.8	-2,221.1	260.9	-1,960.3
1996	917.3	106.3	-13.1	-572.2	-70.1	209.4	577.7	-2,118.4	279.7	-1,838.7
1997	1,205.8	2.7	-12.5	-580.7	-21.1	210.2	804.4	-2,949.6	261.9	-2,687.7
1998	1,026.0	62.5	-11.9	-590.8	-6.9	240.2	719.2	-2,637.0	261.0	-2,376.0
1999	1,002.4	39.8	-11.7	-599.6	-4.0	236.3	663.2	-2,431.7	264.5	-2,167.2
2000	793.4	-11.4	-11.3	-611.4	-22.5	288.9	425.7	-1,561.0	278.4	-1,282.5
2001	872.8	59.6	-10.4	-625.1	-58.7	285.9	524.1	-1,921.9	300.8	-1,621.0
2002	794.7	82.7	-9.2	-636.2	-4.7	244.4	471.7	-1,729.6	283.5	-1,446.2
2003	950.1	19.4	-7.8	-645.6	-57.3	304.3	563.0	-2,064.4	309.8	-1,754.7
2004	1,195.4	-56.4	-6.4	-654.5	-41.9	279.6	715.8	-2,624.6	306.8	-2,317.8
2005	1,062.4	-9.0	-4.7	-663.6	-8.2	290.5	667.3	-2,446.9	296.6	-2,150.3
2006	1,343.2	-124.0	-7.3	-664.6	-32.3	225.6	740.5	-2,715.1	310.0	-2,405.1
2007	1,225.0	-28.6	-4.7	-667.6	-40.6	278.9	762.4	-2,795.4	316.4	-2,479.0
2008	1,528.5	-67.0	-5.1	-670.1	-27.3	166.2	925.1	-3,392.0	313.5	-3,078.5
2009	1,463.3	-26.2	-0.9	-674.2	-7.6	176.6	930.9	-3,413.3	308.1	-3,105.2
2010	1,324.2	110.9	0.5	-682.2	-89.3	219.3	883.4	-3,239.3	346.9	-2,892.4
2011	1,399.0	104.0	1.4	-687.4	-93.2	198.6	922.4	-3,382.3	351.0	-3,031.2
2012	1,492.7	61.8	2.1	-692.7	-2.7	180.4	1,041.6	-3,819.1	314.8	-3,504.3
2013	1,553.4	112.2	1.3	-692.6	-23.6	145.7	1,096.3	-4,019.7	323.8	-3,695.9
2014	1,364.8	175.4	5.8	-698.0	-19.4	217.0	1,045.6	-3,834.0	323.4	-3,510.6
2015	1,560.1	119.4	4.4	-703.3	-10.9	148.0	1,117.6	-4,098.0	323.0	-3,775.0
2016	1,365.3	180.8	4.0	-710.7	-2.2	221.9	1,059.0	-3,883.1	321.4	-3,561.7
2017	1,208.4	230.1	3.3	-715.6	-114.9	245.1	856.4	-3,140.0	371.8	-2,768.2
2018	1,136.8	240.1	4.4	-719.3	-29.3	233.2	866.0	-3,175.3	336.7	-2,838.6
2019	1,091.1	244.6	4.8	-722.8	-3.4	242.1	856.5	-3,140.4	327.2	-2,813.1
2020	1,167.3	230.6	3.8	-724.3	-17.5	229.0	888.8	-3,259.0	333.8	-2,925.1

These estimates include HWP removals and emissions from fires and organic soils. Emissions associated with deforestation are not included. The trends in forest GHG removals are related to the level of annual harvest, extent of afforestation and changes in the age class structure of the national forests over time[33]. Negative CO_2 values represent a net removal of CO_2, but negative C values represent a net emission of C.

Until 2022, Ireland's greenhouse gas inventory used a country specific tier 2 emission factor of 0.59tC/ha/yr for drained forest peat soils derived from work published by Byrne and Farrell

[33] Black, K., Hendrick, E., Gallagher., G., Farrington, P. 2012. Establishment of Irelands projected reference level for Forest Management for the period 2013-2020 under Article 3.4 of the Kyoto Protocol. *Irish Forestry* 69: 7-32.

(2005)[34]. New research[35] on forested organic soils show larger emissions (i.e. 1.68 tC/ha/yr) than previously estimated. Due to the high proportion of forests growing on peats, this threefold increase has led to a significant rise in emissions. In line with the IPCC Good Practice Reporting Guidance this new emission factor has been incorporated into the national inventory reporting methodology and updated data has been supplied as part of the inventory in 2022. For this reason, the data presented in Table 34 differs significantly to the information supplied in last year's report.

[34] Byrne, K. A. & Farrell, E. P. 2005. The effect of afforestation on soil carbon dioxide emissions in blanket peatland in Ireland. Forestry, 78, 217-227.

[35] Jovani-Sancho A.J., Cummins T. & Byrne K.A. 2021. Soil carbon balance of afforested peatlands in the maritime temperate climatic zone. Glob Chang Biol. 27(15):3681-3698.

7. The-Economic Contribution of the Forest Sector

Key statistics

- In 2020, Output (the value of all goods and services produced) at basic prices for the Forestry and logging sector was €180 million. The Intermediate Consumption required to produce this Output totalled €142 million.
- Output (€180 million) minus Intermediate Consumption (€142 million) resulted in Gross Value Added at basic prices of €38 million for the forestry and logging sector;
- For the Wood and wood products (except furniture) sector the output for goods and services was €1.03 billion, while the intermediate consumption totalled €747 million for 2020. This resulted in a GVA of €282 million for the sector.
- The number of people employed directly in the forestry and logging sector averaged 2,800 between 1998 and 2017;
- In 2020 total employment generated by activities in the forest and wood products sector was estimated to be 9,500 full time equivalents;
- Visits to Irish forests are estimated to be over 29 million visits per annum;
- In 2021, 24% of occupied private households visit Woodlands or forests for recreational purposes most weeks with a further 29% visiting most months;
- In 2021, total expenditure was €69.5 million which includes afforestation grants, annual premium payments and grant aid for forest roads.

7.1 Value of the forest and wood products sectors

The output and value-added in the forest and wood products sectors, in terms of output, value added and intermediate consumption, is shown in Figure 31 and Figure 32. Gross Value Added (GVA), a measure of economic activity, for the years 1995 to 2020 as estimated using the Output method (also known as the Production approach). The Output method is one of three ways in which GVA and Gross Domestic Product (GDP) can be calculated.

In 2020, Output (the value of all goods and services produced) at basic prices for the Forestry and logging sector was €180 million. The Intermediate Consumption required to produce this Output totalled €142 million. Output (€180 million) minus Intermediate Consumption (€142 million) resulted in Gross Value Added at basic prices of €38 million. For the Wood and wood products (except furniture) sector the output for goods and services was €1.03 billion, while the intermediate consumption totalled €747 million for 2020. This resulted in a GVA of €282 million for the sector. Further data is available from the CSO[36].

The total value of economic activity in the Forestry and Wood product sectors has increased by 375% and 120% respectively since 2012, which displayed a recent dip for both output and for intermediate consumption.

[36] https://www.cso.ie/en/statistics/nationalaccounts/nationalaccountsoutputandvalueaddedbyactivity/

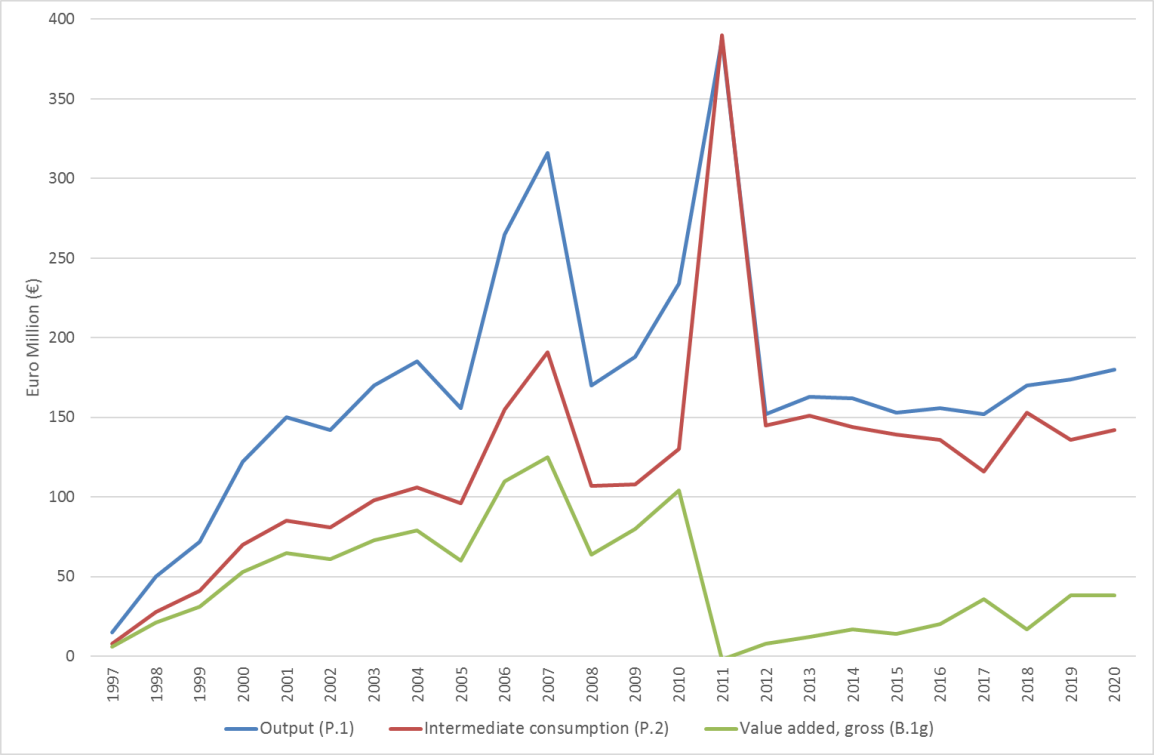

Figure 31: The Output, Intermediate consumption and GVA for the Forestry and logging Sector

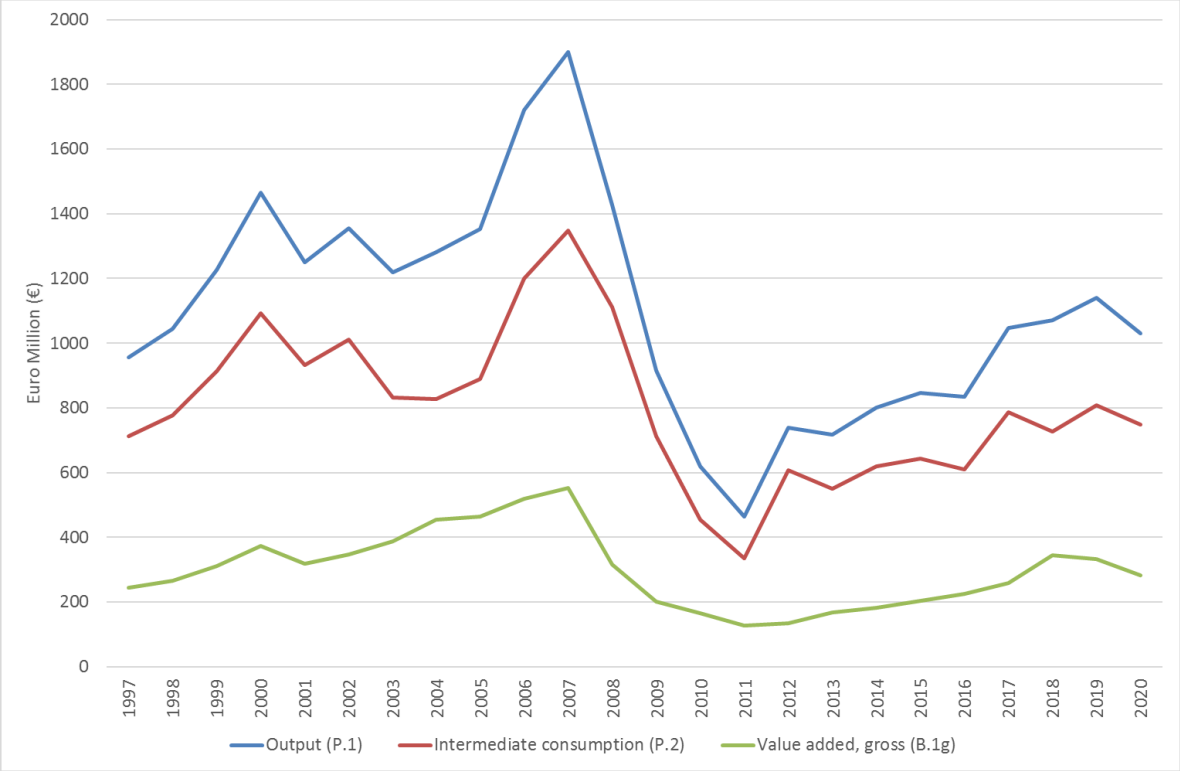

Figure 32: The Output, Intermediate consumption and GVA for the Wood and wood products (except furniture) sector

7.2 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 to be 6,408[37].

In 2012 COFORD estimated that the total employment generated by activities in the forest and wood products sector was 12,000 full time equivalents[38].

In 2020, the COFORD Socio-Economic Contribution of Irish Forests working group produced estimates for employment in forestry & logging sector. A report "*The estimated employment and economic activity associated with the forestry sector*" published in 2022[39] took a bottom-up approach to survey employers in the forestry sector in order to generate coefficients that would link employment to activity as well as estimate employment for the sector. The estimate of direct employment generated in the report is shown in Table 35.

Figures shown for 2020 are derived from a number of sources (as shown in Table 35) using different methodologies to those used in 2010 and this should be taken into account when making comparisons.

Table 35: Estimated employment in the forestry and wood processing sectors

Measure	Sector	2010			2020	
Employment (FTEs)		Direct	Total (Direct +indirect +induced)		Direct	Total (Direct +indirect +induced)
	Forestry & logging	**3125**	**5531**		**1978**	**3501**
	Manufacture of wood & wood products	**3907**	**6408**		**3611**	**5922**

7.2.1 Categorisation of employment statistics

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

- 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 the transport of logs to sawmills are not included.

[37] *An Economic Evaluation of the Market and Non-Market Functions of Forestry*, 2013. COFORD, Department of Agriculture, Food and the Marine.
[38] *Irish Forestry and the Economy*, 2014. COFORD. Department of Agriculture, Food and the Marine.
[39] COFORD, 2022. *The estimated employment and economic activity associated with the forestry sector*. Department of Agriculture, Food and the Marine.
[40] Description of NACE codes available at http://www.cso.ie/px/u/NACECoder/NACEItems/searchnace.asp

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 planing 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.

7.2.2 Labour Force Survey

The Labour Force Survey (formerly the Quarterly National Household Survey) 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 2,800 between 1998 and 2017 while the average number employed directly in sawmilling and planing of wood has averaged 7,200 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 30). Estimates were not produced for 2015, 2018, 2019 and 2020 as the sample size was too small to be considered reliable. Estimates for 2014, 2016 and 2017 are considered to have a wide margin of error and should be treated with caution.

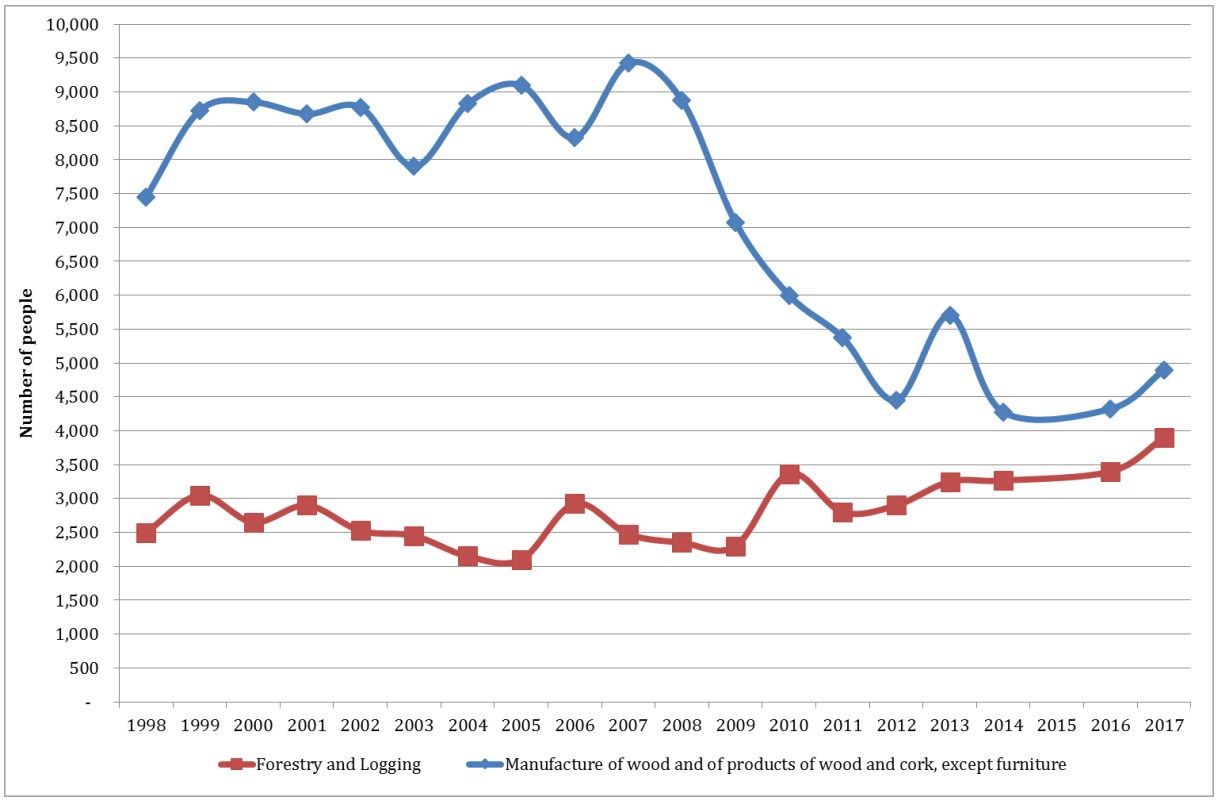

Figure 33: Labour Force Survey estimates (1998-2017)

7.2.3 Census of Ireland 2006, 2011 and 2016

Table 33 outlines persons aged 15 and over, classified by principal economic status and detailed industrial group involved in forestry, logging and related activities[41]. 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 36).

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

Table 36: 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

7.3 Forests & Recreation

There has been a long-standing policy in place of encouraging the use of forests for outdoor recreation. Table 37 shows an upward trend in visitor number to Irish publicly owned forests between 1999 and 2015.

Table 37: Estimate of number of visits to Irish forests 1999 - 2015

Year	Number of forest visits
1999[42]	8,500,000
2004[43]	11,000,000
2005[44]	18,000,000
2015[45]	29,105,759

[41] Available from: https://www.cso.ie/en/csolatestnews/presspages/2017/census2016profile11employmentoccupationsandindustry.

[42] Clinch, P. (1999), *The Economics of Irish Forestry*, COFORD, Department of Agriculture, Food and the Marine.

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

[44] 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

[45] ECOVALUE: *Valuing the Ecosystem Services of Irish Forests*, 2015. Teagasc.

Since the early 1970's there has been an active programme of providing recreational facilities in State forests. At the present time there are nearly 300 recreational sites, 12 forest parks and over 3000 km of hiking trails in forests throughout the country[46]. 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 440,000 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. The most recent figures estimate 29,105,759 visits to Irish forests per annum, and values forest recreation at €179 million per annum.

For the private forest estate the decision to allow public access rests with the forest owner, and is provided on a goodwill basis[47]. Private forest owners who have availed of a roading grant in recent years allow public access to the forest road which may be subject to certain conditions. Public access does not establish any legal right of access by the public to a grant aided forest road.

The CSO carried out a survey of Household Environmental Behaviours - Visits to Nature Areas[48] which was collected as part of the CSO General Household Survey in Quarter 3 2021. The report analyses the frequency and location of visits to nature areas by households. The survey found that 24% of occupied private households visit Woodlands or forests for recreational purposes most weeks with a further 29% visiting most months (Table 38). The age profile of these visitors is outlined in Table 39 with 31% of those aged 35-44 visiting Woodlands or forests most weeks and a further 34% visiting most months.

Table 38: The frequency of visits to green and natural spaces for recreational purposes during the last 12 months

	Most days	Most weeks	Most months	Less frequently	Did not visit	No response	Sample Households
Urban green space (such as a park, field or playground)	32%	34%	13%	12%	8%	0%	4,641
Woodland or forest	7%	24%	29%	26%	13%	1%	4,641
River, lake or canal	8%	20%	21%	33%	17%	1%	4,641
Hill, mountain or moorland	3%	13%	24%	38%	21%	1%	4,641
Beach, other coastline or the sea	8%	19%	27%	37%	9%	1%	4,641
Nature or wildlife reserve	1%	4%	13%	46%	35%	1%	4,641
Fields, farmland or the countryside	16%	15%	17%	32%	19%	1%	4,641

[46] http://www.coillte.ie

[47] *Forest Recreation in Ireland A Guide For Owners & Managers*, 2006. Forest Service, Department of Agriculture, Food and the Marine.

[48] https://www.cso.ie/en/releasesandpublications/ep/p-hebna/householdenvironmentalbehaviours-visitstonatureareasquarter32021/

Table 39: Age profile visitors to a woodland or forest for recreational purposes during the last 12 months

Age group of respondents	Most days	Most weeks	Most months	Less frequently	Did not visit	No response	Sample Households
18-34 years	7%	27%	33%	26%	7%	0%	586
35-44 years	6%	31%	34%	23%	6%	0%	1,035
45-54 years	8%	24%	28%	28%	11%	1%	1,177
55-64 years	8%	20%	27%	27%	17%	1%	979
65 years or over	7%	17%	22%	27%	24%	2%	864

7.4 Public Attitudes Survey on Forestry

In 2021, a market research survey was undertaken for the Department of Agriculture, Food and Marine while developing a new Forest Strategy. This field survey was undertaken by behaviour & Attitudes of the general public to better understand attitudes towards forestry, and exploring wider perspectives of forestry and trees in Ireland[49].

Many Irish adults believe that they live in close proximity to woodlands or forests, with 42% suggesting that they live within five kilometres of a forest. General attitudes to forestry are particularly positive with three out of four wanting to see more forests planted in their own county and with broad and general interest in the planting of more trees in urban areas generally (Figure 34).

Exercise and recreation are the key visit drivers but most acknowledge that we benefit from forests addressing climate change and removing CO_2, while also acknowledging their contribution to mental balance, their enhancement of air quality and their ultimate contribution to habitats for plants and wildlife.

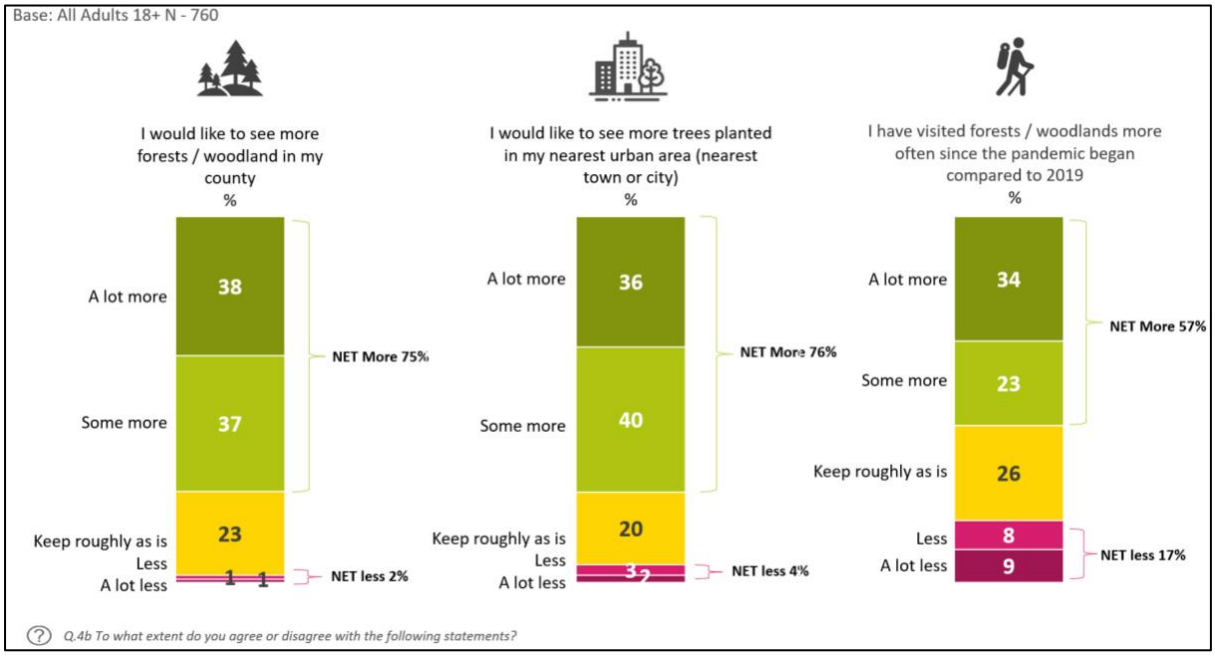

Figure 34: Attitudes towards forest and woodlands

[49] DAFM, (2021). Public Attitudes Survey on Forestry. Department of Agriculture, Food and the Marine. Agriculture House, Kildare Street, Dublin.

When given a choice between broadleaf or coniferous trees, most indicate that they are happy with either, whereas the relatively small group who express a preference one way or the other (Figure 35). Just 10% of the population indicate that they live in a wood-built home, although up to a quarter more of the population say that they would like to do so.

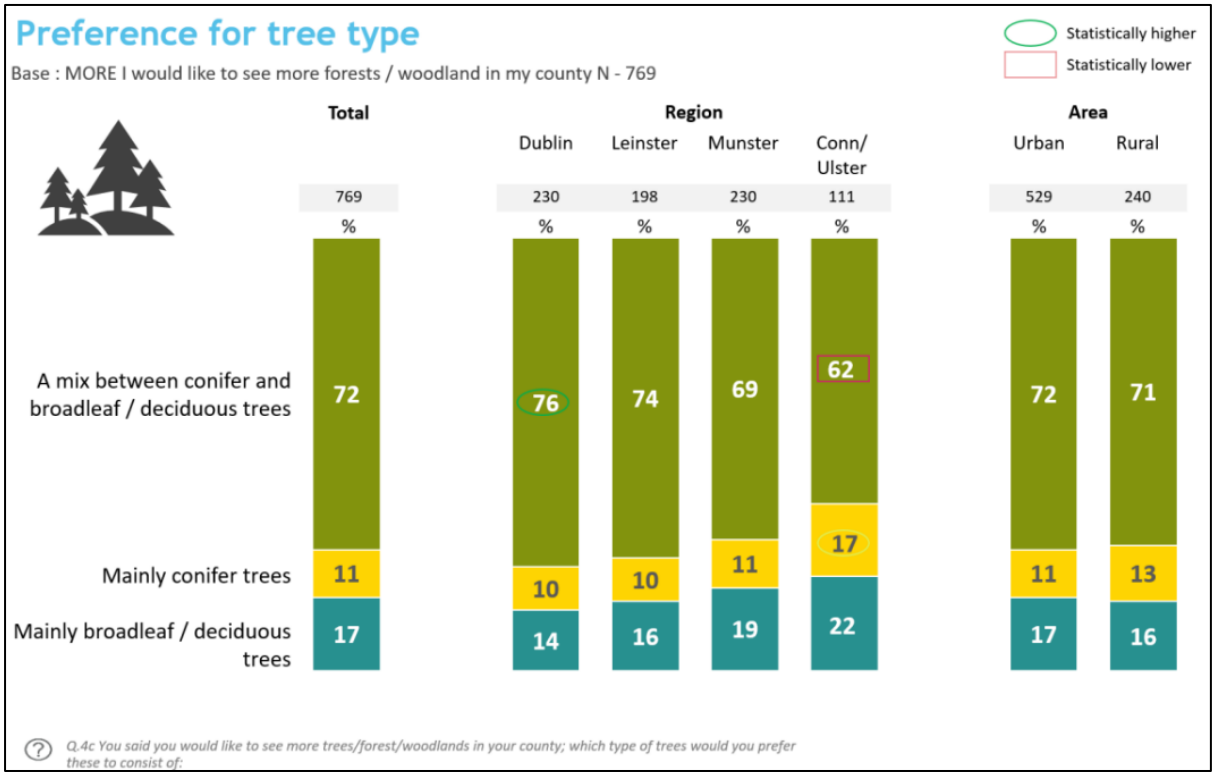

Figure 35: Public preference for a tree or forest type

7.5 State Expenditure on Forestry

Since 1993, €2.6 billion has been expended by the State and European Union on afforestation, including existing premium liabilities and other support measures for the forest sector. In 2021, €69.5 million was spent on forest activities including afforestation, maintenance grants, annual premium payments and grants for forest road infrastructure (Figure 36). Expenditure in 2021 decreased by €9.8 million on the previous year due in part to reduced afforestation levels and the payment of forest premium. A detailed breakdown of expenditure by activity since 2009 is provided in Table 40.

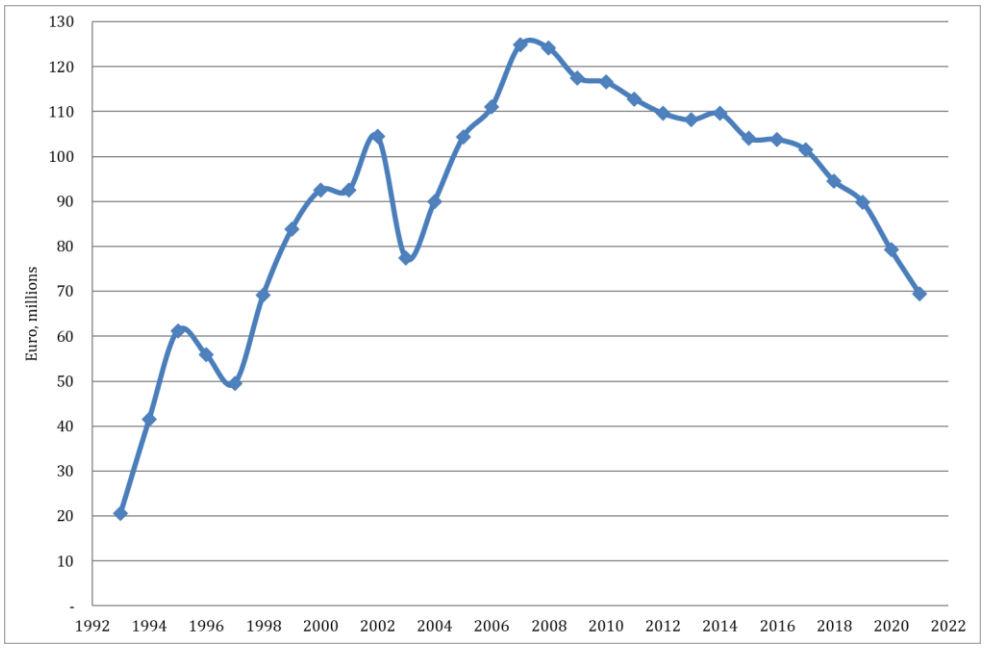

Figure 36: Total state expenditure on forestry (1993-2021)

Table 40: Annual state expenditure on forestry (2009-2021)

Expenditure (1000's Euro)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Main Afforestation Programme													
Grant – 1st Instalment	22,080	27,557	20,482	19,215	17,033	16,759	17,480	18,420	15,819	12,270	10,769	8,074	6,924
Grant – 2nd Instalment	8,675	7,441	7,697	6,334	7,291	7,630	7,357	6,881	6,192	5,916	5,243	5,396	3,834
Premium	70,496	72,285	75,005	75,685	76,013	77,501	73,609	72,418	71,511	68,089	64,063	57,540	51,269
Sundry (e.g. Debt Recovery)	1,075	505	647	379	523	620	259	79	108	106	77	88	89
Afforestation Total	102,326	107,789	103,831	101,614	100,860	102,511	98,705	97,798	93,630	86,381	80,151	71,098	62,117
Forest Roads-Harvesting	5,400	3,694	4,204	3,077	2,709	2,794	2,381	2,561	3,889	3,038	3,796	4,013	2,945
Reconstitution of Woodlands	790	966	827	567	257	253	222	248	130	109	19	27	2
Chalara	0	0	0	0	693	1,274	688	446	811	1,822	1,311	434	236
Reconstitution & Underplanting	0	0	0	0	0	0	0	0	0	0	0	0	29
Storm Darwin	0	0	0	0	0	0	0	0	0	437	195	64	80
Woodland Improvement Scheme	374	248	164	70	65	76	28	22	29	17	6	0	0
Thinning & Tending – WIS	0.0	610	750	971	864	666	470	593	603	441	636	671	496
CCF - WIS	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	74.6	100.7
Shaping of Broadleaves	83	10	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pruning of Conifers	454	56	0.0	233	94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NeighbourWood	670	180	351	435	146	6	0.0	167	130	116	0	199	45
Native Woodland Conservation	851	819	829	1,221	845	514	211	194	289	365	648	504	384
NDP Other Measures	52	3	11	-2	0	0	0	0	0	0	0	0	0
Environmental Assessments	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	407	1,572
Other	0	0	0	0	0	0	0	0	31	21	3	1	14
Support Schemes Total	8,674	6,587	7,136	6,573	5,673	5,582	3,999	4,356	5,912	6,366	6,614	6,396	5,904
Reforestation	4	13	11	0	5	0.0	0.0	11	0.4	0	1	0	0
Forest Inventory	15	7	69	41	30	18	68	34	42	45	11	81	14
Other Capital Total	19	20	81	41	35	18	68	45	43	45	11	81	14
Total Capital	111,018	114,395	111,048	108,227	106,568	108,111	102,772	102,199	99,585	92,793	86,777	77,575	68,035
Promotion	487	289	864	799	828	684	693	840	1,060	1,123	2,189	1,007	891
Training	1,122	954	226	105	80	103	0	0	0	0	0	0	0
Knowledge Transfer	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	37	97
Technical Support	752	393	92	85	232	268	278	234	180	112	111	124	86
Fees International Organisations	37	39	189	8	16	8	10	10	10	0	0	0	0
Forest Sector Development (Coford)	4,289	401	408	380	425	304	350	424	606	475	670	474	458
Miscellaneous (e.g. legal, printing)	-195	94	4	41	20	144	-65	119	100	52	142	3	-110
Total Current	6,491	2,171	1,782	1,418	1,601	1,511	1,265	1,627	1,956	1,762	3,112	1,646	1,423
Overall Total	117,510	116,566	112,830	109,646	108,169	109,622	104,037	103,826	101,541	94,555	89,889	79,221	69,458

8. Forest Protection and Health

8.1 Introduction

One of the key objectives of the Forestry Inspectorate of DAFM is to implement the forestry aspects of the EU Plant Health Regulation 2016/2031 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 causes.

The Forestry Inspectorate also oversees the national implementation of the FAO, IPPC International Standard for Phytosanitary Measures (ISPM) 15, Regulation of 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.

Regulation (EU) 2016/2031 became effective from 14th December 2019 repealing and replacing the existing Council Directive 2000/29/EC. The related Official Controls Regulation 2017/625 also came into effect on that date and impacts inter alia on how official import controls and diagnostics are carried out. DAFM continues to actively organise policy and operational requirements to meet the articles of Regulations 2016/2031 and 2017/625.

Increased stakeholder engagement is an important element of the new Plant Health regime and in 2021 the Forestry Inspectorate contributed to the ongoing roll out of the first DAFM Plant Health and Biosecurity Strategy and the International Year of Plant Health (IYPH). 2020 was the IYPH but this was extended into 2021 due to the disruptions caused by COVID-19. A new Forest health webpage was established and a Forest Health News – Newsletter initiated.

Key statistics

- In In 2021 the impact of Brexit was felt through an increased focus on import controls and increased demand for export certification.
- Operational responsibility for import controls at Dublin Port, Dublin Airport and Rosslare Europort transferred to the new Import Controls Operations Division within the Department.
- The FAO International Year of Plant Health 2020 was extended in 2021 due to the impact of COVID-19 on planned activities.
- There were no findings of any EU priority pests or pests for which Ireland has current EU Protected Zone status in Irish forests during annual surveys in 2021.
- Surveys for the presence and spread of ash dieback disease conducted in 2021 included a systematic survey of National Forest Inventory points across the country leading to further findings. By the end of 2021 there had been findings in ash in over 675 locations in various settings – forests, nurseries and garden centres, on farm planting, roadside planting, hedgerows and private gardens in all 26 counties.
- *Phytophthora ramorum* was first detected in Japanese larch in 2010 and at the end of 2021 has been confirmed present at a total of 61 forest locations in this tree species.
- In 2021 the fungus *Gnomoniopsis smithogilvvi* was found for the first time in Ireland associated with shoot dieback in sweet chestnut (*Castanea sativa*).

- A new Forest health webpage was established and a Forest Health News – Newsletter initiated.
- A new system for the assessment of competence of Authorised Operators to issue Plant Passports was developed and rolled-out to the sector and hosted on the web-page.
- 51 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.
- In conjunction with The Tree Council of Ireland, "A Landowner's Guide to Managing Roadside Trees" was produced and launched in October 2021.
- An on-line presentation to over 100 attendees on the threat of exotic forest pests to Irish forests was made through the ITGA-FORESTRY.IE organized Webinar Series in association with the Irish Farmers Journal
- COVID-19 continued to impact the work of the Forest Health Section through 2021.

8.2 Biotic Threats – Pests and Diseases

8.2.1 Priority Pests and Union Quarantine Pests

The EU Plant Health Regulation sets out a list of priority pests which require mandatory annual surveys and reporting including *Agrilus planipennis* (emerald ash borer), *Agrilus anxius* (bronze birch borer), *Anoplophora chinensis* (citrus long-horn beetle), *Anoplophora glabripe*nnis (Asian long-horn beetle), *Dendrolimus sibiricus* (the Siberian moth) and *Bursaphelenchus xylophilus* (pine wood nematode). EU priority pests are those pests whose potential economic, environmental or social impact is the most severe for the Union territory. The Regulation also sets out a long list of Union quarantine pests which must be included in a multiannual survey plan of five to seven years. In 2021 a new survey network was established for the EU priority pest the red necked longhorn beetle (*Aromia bungii*) which is a pest of cherry (*Prunus* sp.). In 2021 Ireland also continued its participation in EU co-funded surveys for regulated pests. There were no findings of any EU priority or Union quarantine pests in Irish forests in 2021.

8.2.2 Protected Zone Organisms

Ireland has Protected Zone status for 14 harmful forestry organisms present in other EU Member States but not present here. To justify Ireland's Protected Zone status, the Forestry Inspectorate conducts national forest surveys and submits reports annually to European Commission. No detections of any of these organisms occurred in surveys conducted during 2019, 2020 and 2021.

8.2.3 Protected Zone Organisms

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 including reports submitted via the web-based Tree Check App. This may involve site visits and taking of samples for laboratory analysis. Table 41 outlines the summary of these forest surveys over the year for 2021. **Figure 37** displays the systematic and risk-based observation points across Ireland for the detection of bark-beetles.

Table 41: Summary of forestry surveys in 2021

Pest by category	Number of surveys	Number of findings
EU Priority Pests		
Agrilus anxius Bronze birch borer	31	0
Agrilus planipennis Emerald ash borer	30	0
Bursaphelenchus xylophilus Pinewood nematode	57	0
Dendrolimus sibiricus Siberian silk moth	158	0
Anoplophora chinensis Citrus longhorn beetle	30	0
Anoplophora glabripennis Asian longhorn beetle	30	0
Aromia bungii Red necked longhorn beetle	10	0
Union Quarantine Pests		
Phytophthora ramorum (non-EU isolates)	54	0
Monochamus spp. (non-European)	70	0
Pissodes strobi	81	0
Fusarium circinatum	74	0
Atropellis spp.	70	0
Chryosmyxa arctostaphyli	81	0
Scolytidae spp. (non-European)	72	0
Davidsoniella virescens	26	0
Protected Zone pests		
Ips amitinus (small spruce bark beetle)*	72	0
Ips cembrae (large larch bark beetle)*	72	0
Ips duplicatus (northern bark beetle)*	72	0
Ips sexdentatus (six-toothed bark beetle)*	72	0
Ips typographus (eight-tooted spruce bark beetle)*	72	0
Dendroctonus micans (great spruce bark beetle)	72	0
Cephalcia lariciphila (European web-spinning larch sawfly)	45	0
Cryphonectria parasitica (chestnut blight)	25	0
Gilpinia hercyniae (European spruce sawfly)	81	0
Entoleuca mammata (hypoxylon canker)	16	0
Gremmeniella abietina (Brunchorstia disease)	75	0
Thaumetopoea pityocampa (pine processionary moth)	25	0
Thaumetopoea processionae (oak processionary moth)	25	0
Dryocosmus kuriphilus (oriental chestnut gall wasp)	25	0

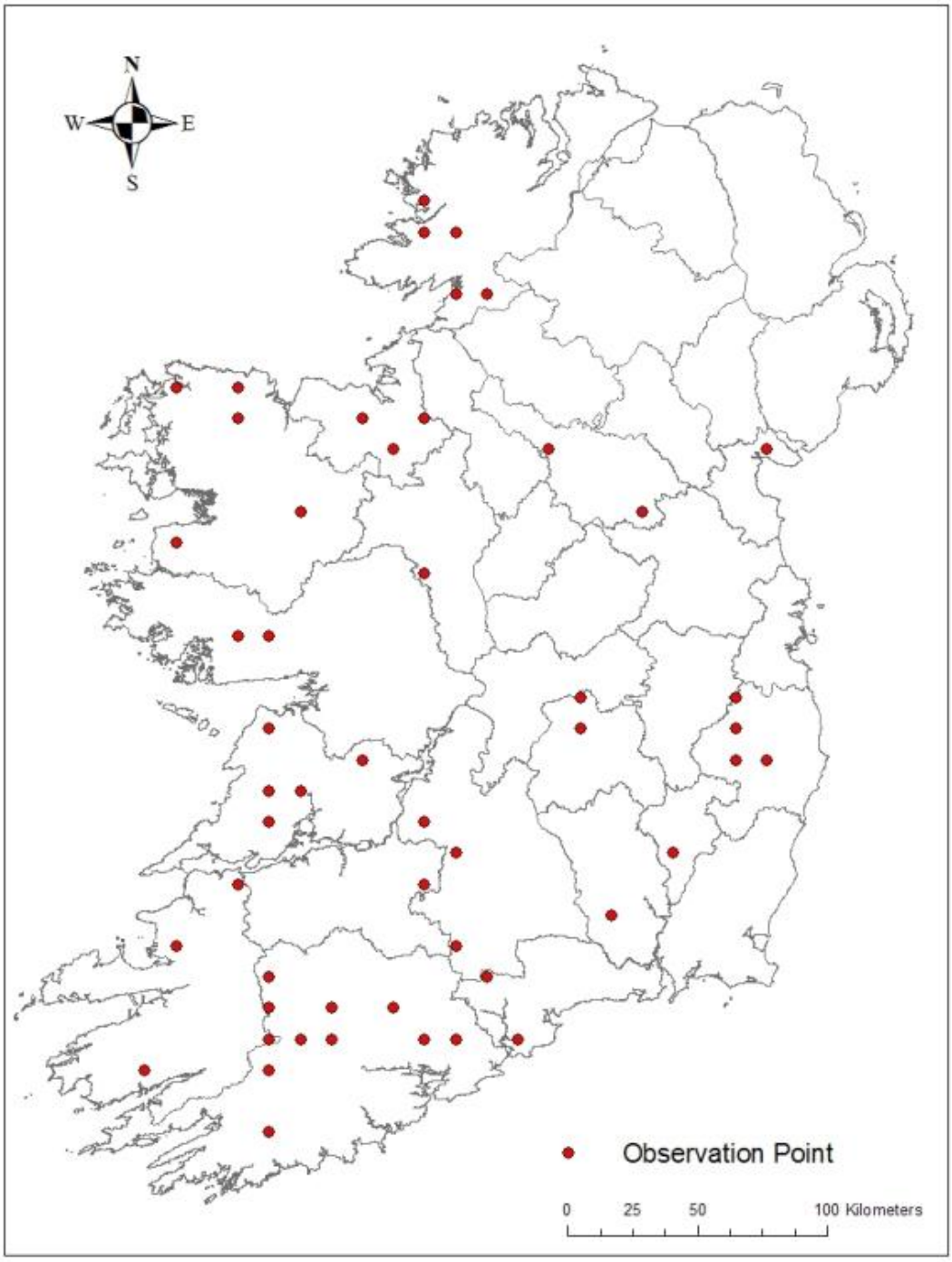

Figure 37: Indicative map of systematic and risk-based bark beetle Fixed Observation Point locations

8.2.4 Other Issues and Findings

The finding of *Ips typographus* in late 2018 in a woodland in Kent, England represents an increased threat of the introduction of this bark beetle to Ireland and prompted a coordinated response on the island of Ireland from DAFM and DAERA. There were further findings of the bark beetle in south eastern England in 2021. As part of the additional risk-based surveys since 2019 DAFM, in collaboration with Coillte, has maintained a supplementary network of risk-based bark

beetle monitoring plots distributed through the Coillte estate. These new targeted monitoring plots complement and enhance the existing systematically distributed network of plots.

In 2021, the fungus *Gnomoniopsis smithogilvyi* was found for the first time in Ireland associated with shoot dieback in sweet chestnut (*Castanea sativa*) at a gene bank in Co. Wicklow. A survey for the fungus was incorporated into the existing annual Protected Zone surveys on sweet chestnut and further findings were made of the fungus in forests in counties Wicklow and Cavan. The fungus is not regulated and appears to be of minor concern in forest settings although may be more serious in young gene banks or in a nut production context.

8.2.5 Ash Dieback (*Hymenoscyphus fraxineus*)

Following the first confirmed finding of Ash Dieback disease in October 2012, on imported trees used in forestry plantations, 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 2021 included a systematic survey in a selection of 10x10km grid squares where there had not previously been a confirmed positive. The surveys complemented our survey for the Union priority pest emerald ash borer. By the end of 2021 there had been findings in ash in all 26 counties in over 675 locations in various settings – forests, nurseries and garden centres, on farm planting, roadside planting, hedgerows and private gardens. In 2021, due to the wide distribution of Ash Dieback Disease reports of the disease from the general public in non-grant aided ash trees, for example garden trees and hedgerow trees, were not routinely sampled for laboratory analysis. In light of the increasing numbers of findings DAFM switched to mapping findings on the basis of whether the disease has been found in 10km grid squares rather than showing and recording individual findings. Figure 38 displays the findings as of 31st December 2021 as illustrated on a 10x10 km grid square basis.

While *H. fraxineus* is not a regulated disease under the EU Plant Health Regulation (2016/2031) a Ministerial Order to provide for measures to prevent the spread of *H. fraxineus* in the genus Fraxinus L. was introduced on the 6th 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. 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. In April 2018, DAFM commenced a review of the national response to ash dieback including the Reconstitution Scheme on the basis that eradication of the disease is no longer a possibility. This included a stakeholder and public consultation period, detailed field consideration of damage level evaluation together with a broader range of silvicultural and management options with the assistance of Teagasc and international experts. Support schemes were reviewed to ensure the continued relevance of DAFM's response and value for money, and to ensure that the forest owner is provided with a broader range of silvicultural and management options. In July 2020, the new Reconstitution and Underplanting (RUS) Scheme for ash dieback was launched.

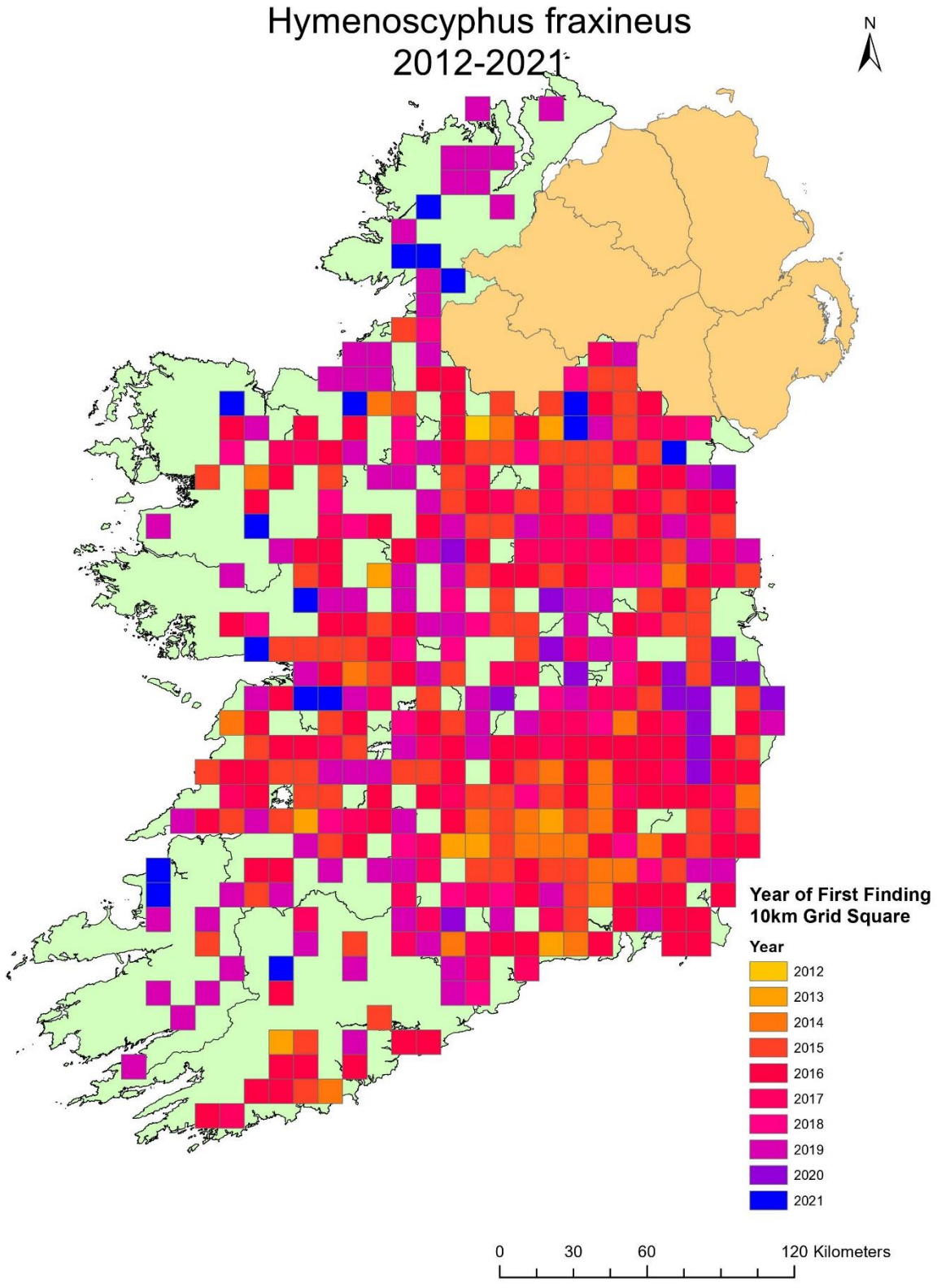

Figure 38: Ash Dieback findings in Ireland 2012 – 2021

8.2.6 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 2021 the disease had been confirmed present in Japanese larch at 56 forest locations affecting approximately 337 ha of forestry There were no further forestry findings in Japanese larch in 2021. Since 2010 the Forestry Inspectorate has worked with Coillte (as the principal landowner affected) in undertaking sanitation felling of infected larch in an effort to limit spread and continued to do so in 2020. Figure 39 displays the findings as of 31st December 2021 as illustrated on a 10x10 km grid square basis.

At an EU level the review of the regulatory status of *P. ramorum* continued in 2021 at the Standing Committee on Plant Health and other Commission Working Groups as part of the wider discussions revising the Annexes to the new Plant Health Regulation. The pathogen has been regulated under EU-wide emergency measures since 2002 and there was considerable debate as to whether it should be permanently listed as a quarantine organism under the EU Plant Health regime or whether it should be downgraded to regulated non-quarantine pest (RNQP) status or even deregulated. In 2020 it was determined that non-EU isolates of *P. ramorum* will be treated as Union quarantine pests while EU-isolates will be regarded as RNQPs. This will impact on DAFM policy in relation to the disease.

P. ramorum 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.

Phytophthora kernoviae has been detected on wild rhododendron in a number of forest locations. To the end of 2020 there were eight such findings, six 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 2021.

A relatively newly described Phytophthora species *P. pluvialis* was found for the first time in Great Britain in late 2021 causing damage to western hemlock (*Tsuga heterophylla*) and Douglas fir (*Pseudotsuga menziesii*) in forests there. *P. pluvialis* is not a regulated pest and the risk it poses is still uncertain as the scientific understanding is developing but precautionary surveys will be carried out in Ireland in 2022.

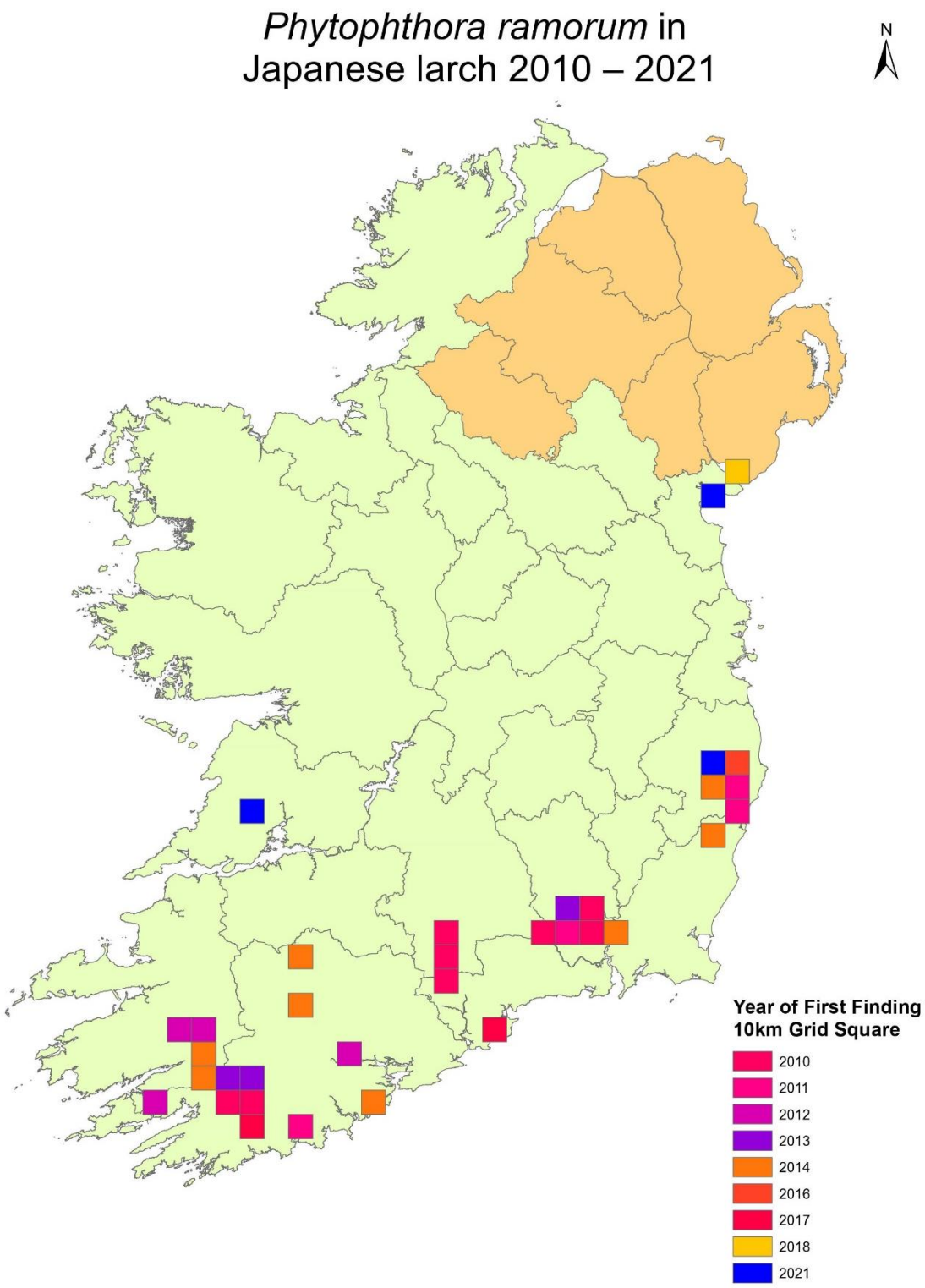

Figure 39: *Phytophtora ramorum* findings in Ireland 2010-2021

8.3 EU Plant Health Regulation & Import Controls

Import inspections of wood and wood products from Third Countries regulated under the EU Plant Health Regulation are routinely conducted to ensure compliance with entry requirements as part of the Customs clearance process. In 2021 operational responsibility for import controls at Dublin Port, Dublin Airport and Rosslare Europort were transferred to the Department's new Import Controls Operations Division. Imports from Great Britain began to be treated like other

Third Country imports and there was an overall increase in the amount of import inspections carried out. In 2021, 879 third country consignments received a documentary check and if appropriate to the requirements, were physically inspected. Nine were found to be non-compliant with the import requirements. Appropriate measures were taken where non-compliances were detected depending on the nature of the non-compliance.

The Department also has a presence at Tivoil Docks Port of Cork Company for the inspection of controlled wood and wood products coming into Ireland from third countries (mainly the USA and Canada). In 2021 118 consignments received a documentary check and if appropriate to the requirements were physically inspected. All were found to be compliant with the import requirements. The Department also has an office in Waterford port and services shipments coming into other ports if required.

In 2021 a new Regulation (2021/127) on monitoring wood packaging material associated with certain goods from China, India and Belarus came into effect, replacing the previous and expired Commission Implementing Decision (2018/1127/EU) which applied to certain goods from China and Belarus only. Due to COVID-19 restrictions fewer physical checks than normal were carried out on these consignments. 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 as amended) and wood packaging from other countries. Wood packaging associated with 211 consignments from Portugal via Dublin Port was checked for compliance in 2021.

The Forestry Inspectorate also provides advice and deals with queries regarding import and export requirements related to wood/wood products and forest reproductive material. The Forestry Inspectorate provides an export certification service for wood and wood products being exported to third countries, providing Phytosanitary Certificates where required by the importing country. Demand for Phytosanitary Certificates for export has increased greatly in 2021 due to Brexit – See Section 7.5.

DAFM preparations in 2020 ahead of Brexit had focussed on ensuring adequate infrastructure, IT systems and staff were in place to cope with the impact of Brexit and these developments were essential in handling the new import controls required on GB trade from January 1st 2021 (See Table 38). Prior to Brexit coming into force, these requirements were not in effect as a consequence of both Ireland and the UK being part of the single market. The impact has been the introduction of new mandatory notification and inspection requirements for both imports from Great Britain and exports to Great Britain. Forestry imports from Great Britain have largely been via 'roll-on roll-off' transport through Dublin Port but there is also a considerable trade of coniferous roundwood into a number of regional ports.

Over the years, Irish wood processors have supplemented domestically sourced roundwood, with imported roundwood from the South West of Scotland (the "Pest Free Area - PFA"). This is the only area from which coniferous roundwood with bark (which is not kiln dried) may be imported into Ireland. This is because this area is recognised as free from quarantine bark beetles including the great spruce bark beetle *Dendroctonus micans*. Due to the log supply shortage arising from the current difficulties with issuing felling licences, Irish wood processors have in 2020 and into 2021, significantly increased the volumes of roundwood imported from the Pest Free Area of Scotland.

As a result of the United Kingdom leaving the EU and then the Single Market at the end of the transition period, coniferous roundwood with bark originating in the United Kingdom (Great Britain) became subject to mandatory import control. Prior to 31st December 2020, roundwood from the Pest Free Area could be imported with a Plant Passport, but without official border controls and mandatory inspections. The new requirements for the importer include the need to source a Phytosanitary Certificate from the United Kingdom authorities and to provide advance notification of the import, together with the Phytosanitary Certificate to the Department. Under the Official Controls Regulation (EU 2017/625), imports of controlled commodities can only be made through officially designated and approved places of import called Border Control Posts (BCPs) and it is at these that DAFM, through the Forestry Inspectorate, carries out Official Controls on imported goods.

In 2021, there were 135 imports of roundwood into Ireland amounting to over 222,000 tonnes of coniferous roundwood from the PFA in Scotland. This was by far and away the busiest year for this type of import into the country, as a result of difficulties with licencing.

8.4 Export Certification

The UK market is of enormous importance for the Irish forest sector. Before the UK left the EU Plant Passport requirements applied to a range of forestry plants, wood and wood products moving from Ireland to the UK. Upon leaving the EU new phytosanitary requirements applied including the requirement for an exporter of a controlled commodity to obtain a Phytosanitary Certificate from the Department of Agriculture and the Marine which involves inspection and the issue of an official document by the Department to the exporter. Previously under the Plant Passport regime there was no need for direct involvement of the Department with each individual export.

In order to meet this new demand from the exporting sector a new IT system Export Certification System (ECS) was developed and made available to the sector through an on-line portal. Exporters were briefed throughout on the new requirements and the mechanism for application for Phytosanitary Certificates backed up by training. New staff were recruited by the Department to deal with this new requirement.

Overall, in 2021 export certification was provided by the Forest Health Section for a range of forestry plants wood and wood products including sawn timber, bulk roundwood exports, bark, Christmas trees and forestry plants. In all, 699 Phytosanitary Certificates were issued to Irish exporters thus facilitating continued access to this key market.

8.5 Authorisation to issue Plant Passports

In the EU, the movement of plants for planting and other commodities such as coniferous wood that is not bark free is regulated through the plant passport system. In Ireland therefore there are regular inspections of nurseries and other forestry professional operators each year. Under the new Regulation 2016/2031 the movement of coniferous roundwood for example from the forest to the processor must be accompanied by a plant passport.

Regulation 2016/2031 prescribes conditions that professional operators must meet in order to be authorised by DAFM to issue plant passports and authorised professional operators are subject to annual inspections by DAFM. In 2021, in part fulfilment of these obligations DAFM

launched an online assessment for professional operators to demonstrate their competency in relation to plant passporting as part of the authorisation process. This is hosted on the updated Forest Health Section of the gov.ie website which also provides information on forest health matters for all stakeholders.

8.6 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, Regulation of 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. Since January 1st 2021, this requirement also applies to wood packaging going from Ireland to Great Britain. 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 subject to a specific phytosanitary treatment (e.g. heat treatment) and each individual unit of the wood packaging material must be marked 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 2021, there were 51 companies registered to operate within the ISPM No. 15 programme in Ireland. Companies in the ISPM No. 15 Programme are subject to Official Controls to ensure compliance with agreed Standard Operating Procedures and that the wood packaging material is fully compliant with the standard.

8.7 Abiotic

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

8.7.1 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 40 shows the area of forests damaged by fire from 1930 to 2019. In the late 1970's and early 1980's, considerable areas of public forest were burnt. Fire damage

levels were high in both public and private forests in 2010 and 2011 following protracted dry periods in spring. The high level of forest fire damage in 2017 is primarily attributed to the Cloosh fire in Co. Galway, which impacted approximately 1,500 ha of forest.

Estimates of fires in privately-owned forests for the periods 1985-2005, 2010-2016 and 2018-2019 were derived by multiplying the proportion of public forest area destroyed by fire each year by the private forest area. In 2017 the private estate was directly estimated due to large single event at Cloosh, which would not be representative of the private estate.

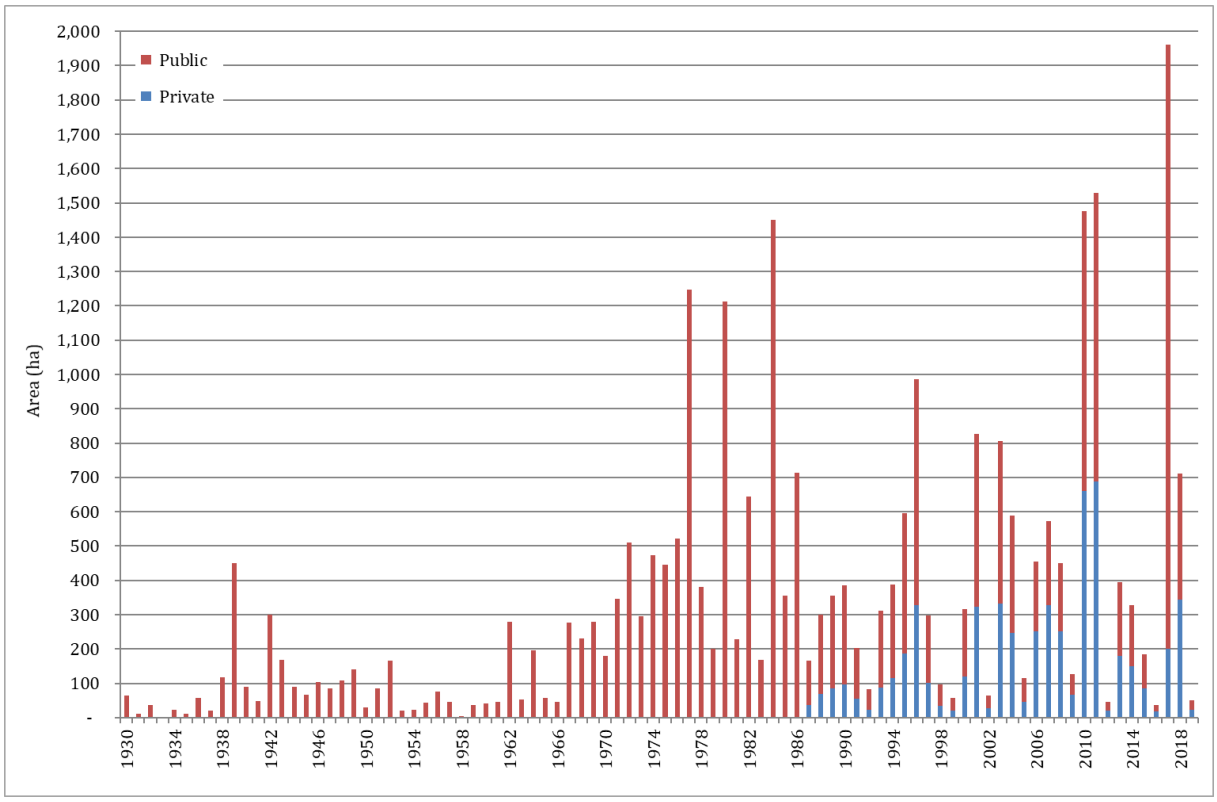

Figure 40: Area of forest damaged by fire 1930-2019

9. Forest Reproductive Material

DAFM 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 being 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

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 seeds and plants may also be subject to the requirements of EU Regulation 2016/2031, the Plant Health Regulation. This regulation replaced Council Directive 2000/29/EC (commonly referred to as the Plant Health Directive) in December 2019 with an aim to modernise the plant health regime and provide more effective measures for the protection of the Union's territory and its plants and forests from destructive pests and disease.

Key statistics

- 242 Seed Collection Permits and 91 Master Certificates of Provenance were issued in 2021 in relation to home collected forest reproductive material.
- 13 new operators registered in 2021 under the requirements of the FRM Directive
- 2 new Source identified pedunculate oak stands were added to the National Register of Basic Material in 2021. 29 sources were removed. These consisted mainly of conifer stands that had come to the end of their rotation. The total area on the register at the end of 2021 stands at 4,532 ha.
- Over 25,000 kg of acorns were sown 2021, equating to over 2.4 million oak trees. This is a significant increase compared to 2020. It included over 8,800 kg pedunculate oak and 5,500 kg of sessile oak sourced from Irish seed stands, supplemented with an additional 10,800 kg pedunculate oak acorns imported from the Netherlands.
- The other main broadleaf trees sown in nurseries for forestry include: sycamore, alder, downy and silver birch, beech, cherry and sycamore.
- Over 210 kg of Sitka spruce was sown in forestry nurseries, equating to over 21 million plants. The other main conifer species included: Norway spruce, lodgepole pine, Scots pine, Douglas fir, together with smaller quantities of larch and western hemlock.
- Increasingly improved seed (*Qualified'* and '*Tested'*) is being utilised for the main conifer and broadleaf species.

9.1 Seed Collection permits and master certificates of provenance

In 2021, 242 Seed Collection Permits were issued – an increase on the previous year (99 issued in 2020). During 2021, 91 Master Certificates of Provenance were issued (75 issued in 2020). These figures vary from year to year depending on availability of suitable seed and levels of demand.

9.2 National Register of Approved Basic Material

In accordance with EC Directive 1999/105/EC, each EU Member State holds a national register of approved forest basic material. DAFM is responsible for the national register and updates it annually. New entities are evaluated according to criteria described in the Directive and following inspection entered on the register according to four different categories.

- *Source identified:* Reproductive material derived from basic material which may be either a seed source or stand located within a single region of provenance.
- *Selected:* Reproductive material derived from basic material which shall be a stand located within a single region of provenance, which has been phenotypically selected at the population level.
- *Qualified:* Reproductive material derived from basic material which shall be seed orchards, parents of families, clones or clonal mixtures, the components of which have been phenotypically selected at the individual level and which meets certain prescribed requirements
- *Tested:* Reproductive material derived from basic material which shall consist of stands, seed orchards, parents of families, clones or clonal mixtures. The superiority of the reproductive material must have been demonstrated by comparative testing or an estimate of the superiority of the reproductive material calculated from genetic evaluation of the components of the basic material.

The total area of forest basic material on the National Register of Approved Basic Material at the end of 2021 stands at 4,532 ha (Table 42).

Table 42: Summary of the 2021 National Register of Approved Basic Material by forest reproductive material category and area (ha)

Species	Source Identified	Selected	Qualified	Tested	Total
Abies procera	-	13	-	-	13
Acer pseudoplatanus	-	54	3	-	57
Alnus cordata	-	1	-	-	1
Alnus glutinosa	113	-	2	-	115
betula pubescens	30	13	0.2	-	44
Castanea sativa	-	8	2	-	10
Chamaecyparis lawsoniana	-	3	-	-	3
Cryptomeria japonica	3	-	-	-	3
Cupressus macrocarpa	-	1	-	-	1
Fagus sylvatica	3	79	-	-	82
Fraxinus excelsior	136	22	4	-	162
Larix decidua	-	17	-	-	17
Larix kaempferi	-	12	-	-	12
Larix x eurolepis	-	-	3	-	3
Picea abies	-	274	-	-	274
Picea sitchensis	-	355	5	3	363
Pinus contorta	-	105	2	-	108
Pinus nigra var. maritima	-	63	-	-	63
Pinus radiata	-	12	-	-	12
Pinus sylvestris	37	162	5	-	204
Prunus avium	-	-	1	-	1
Pseudotsuga menziesii	-	231	-	-	231
Quercus petraea	1,064	541	-	-	1,605
Quercus robur	683	384	-	-	1,067
Sequoia sempervirens	1	-	-	-	1
Taxus baccata	34	-	-	-	34
Thuja plicata	-	19	-	-	19
Tsuga heterophylla	-	28	-	-	28

9.3 *Utilisation of Forest Reproductive Material in Afforestation and Reforestation*

Table 43 & Table 44 summarise data on seed used in Irish forest nurseries for the period 2017-2021 for broadleaf and conifer species respectively[50]. Table 45 lists kgs of seed used in Irish forest nurseries in 2021 by FRM category.

Table 43: Main broadleaf species sown (kgs seed & number of plants ('000)) in forest nurseries (2017-2021)

Species	2017		2018		2019		2020		2021	
	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)
Acer pseudoplatanus	153	214	15	21	95	133	50	70	50	70
Alnus glutinosa	113	3,387	92	2,754	118	3,525	134	4,023	67	1,998
Betula pendula	7	204	8	227	8	225	6	193	6	185
Betula pubescens	54	2,439	52	2,343	60	2,700	55	2,490	38	1,689
Fagus sylvatica	1,041	832	683	546	870	696	1,170	936	31	25
Fraxinus excelsior	-	-	-	-	-	-	6	15	-	-
Prunus avium	-	-	-	-	-	-	-	-	59	47
Quercus petrea	5,363	429	4,269	342	1,400	112	27	22	5,683	455
Quercus robur	20,663	2,066	25,302	2,530	15,406	1,541	2,530	202	19,614	1,961

Table 44: Main conifer species sown (kgs seed & number of plants ('000)) (2017-2021)

Species	2017		2018		2019		2020		2021	
	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)
Larix spp.	0.3	16	0.3	15	0.4	18	0.3	15	0.30	15.00
Picea abies	101	4,024	91	3,643	104	4,154	0.38	19	54.50	2,180.0
Picea sitchensis	280	27,986	247	24,680	380	37,950	85	3,400	210.5	21,050.0
Pinus contorta	23	2,030	22	1,983	25	2,247	38	3,421	24.75	2,227.50
Pinus sylvestris	67	2,685	80	3,197	46	1,834	16	630	34.80	1,392.00
Pseudotsuga menziesii	20	490	19	481	30	745	40	1,003	33.40	835.00
Tsuga heterophylla	0.5	37	0.6	44	0.4	28	-	-	0.13	10.40

[50] Data on seed utilisation were sourced from Coillte CGA and None-So-Hardy (Forestry) LTD. Data inclusive of subsequent sales to horticulture sector and plants for export.

Table 45: Main conifer and broadleaf sown (kgs seed & number plants ('000)) in 2021 by species and FRM category.

Species	Source ID		Selected		Qualified		Tested		Total	
	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)	kg	Plants ('000)
Acer pseudoplatanus	50	70	-	-	-	-	-	-	50	70
Alnus glutinosa	-	-	67	1,998	-	-	-	-	67	1,998
Betula pendula	-	-	6	185	-	-	-	-	6	185
Betula pubescens	36	1,627	0.5	20	0.9	42	-	-	38	1,689
Fagus sylvatica	-	-	31	25	-	-	-	-	31	25
Fraxinus excelsior	-	-	-	-	-	-	-	-	-	-
Larix spp.	-	-	-	-	0.3	15	-	-	0.3	15
Picea abies	-	-	50	2,000	5	180	-	-	55	2,180
Picea sitchensis	-	-	78	7,800	-	-	133	13,250	211	21,050
Pinus contorta	-	-	21	1,899	4	329	-	-	25	2,228
Pinus sylvestris	-	-	5	200	24	952	6	240	35	1,392
Prunus avium	59	47	-	-	-	-	-	-	59	47
Pseudotsuga menziesii	-	-	10	255	-	-	23	580	33	835
Quercus petrea	-	-	5,683	455	-	-	-	-	5,683	455
Quercus robur	2,167	217	13,747	1,375	-	-	3,700	370	19,614	1,961
Tsuga heterophylla	0.1	38	-	-	-	-	-	-	0.1	38

10. International comparators

Key statistics

- At 11.4%, forest cover in Ireland in 2020 was one of the lowest in the EU 27, where the average forest cover was 38.3%; Worldwide forest cover was 31.1%;
- In 2020, public forest ownership in Ireland was at 54%, close to the EU average of 53.5%;
- Annual roundwood harvest was 4.7 million m^3, compared with an EU average of 21.8 million m^3 in the same year (2015 data);
- Fellings represented at 64.5% of annual increment in 2015, which was slightly below the EU average of 66.8%;
- Of all the EU Member States, since 1990 Ireland has had the highest rate of increase in forest expansion as a percentage of total forest cover.

10.1 Global & EU 27 Forest Cover

Despite having afforested more than 320,000 ha since 1990, Ireland remains one of the least forested countries in Europe. In 2020, when the FAO *Global Forest Resources Assessment* was published, Ireland had 11% forest cover, compared with a total forest cover of 38.3% in the EU 27 and a 31.1% forest cover worldwide (Figure 41). The total forest area and the percentage of forest cover in European countries is detailed in Figure 42 & Figure 43.

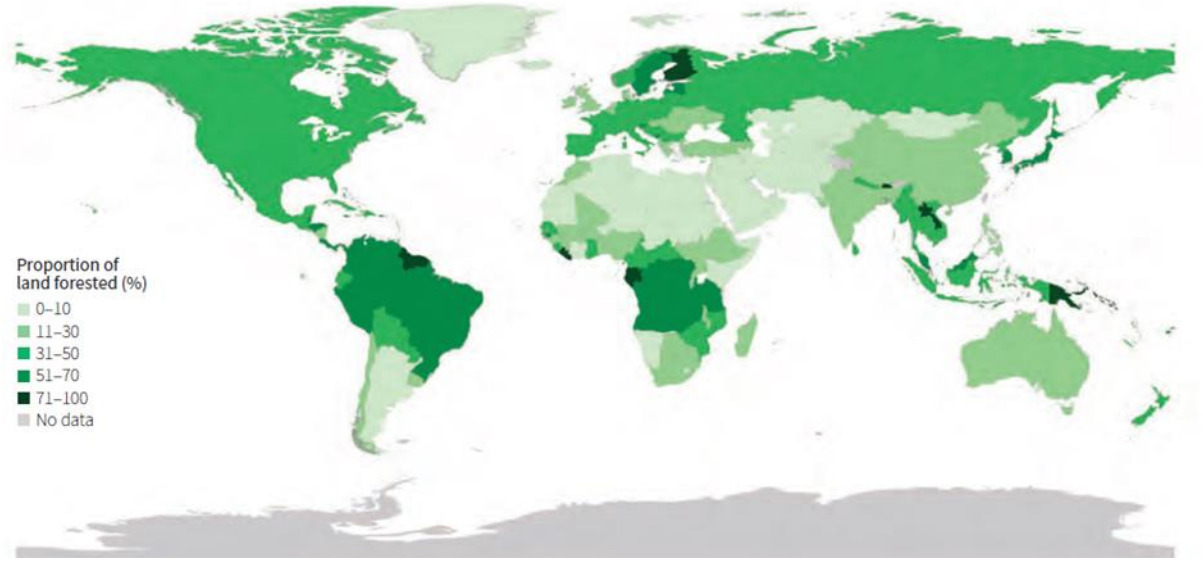

Figure 41: Forest area as a percentage of total land area (Source: FRA 2020)

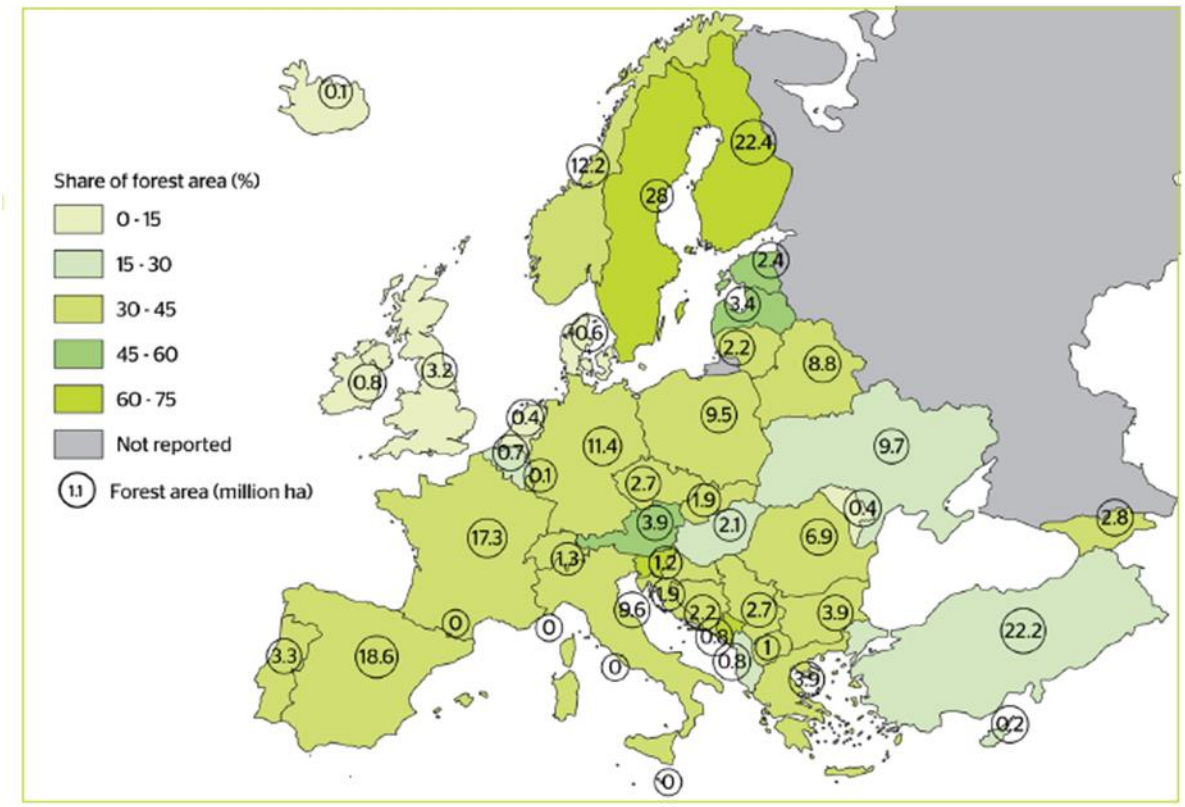

Figure 42: Forest area (million ha) and share (percentage) of country forested (Source: State of Europe's Forests 2020)

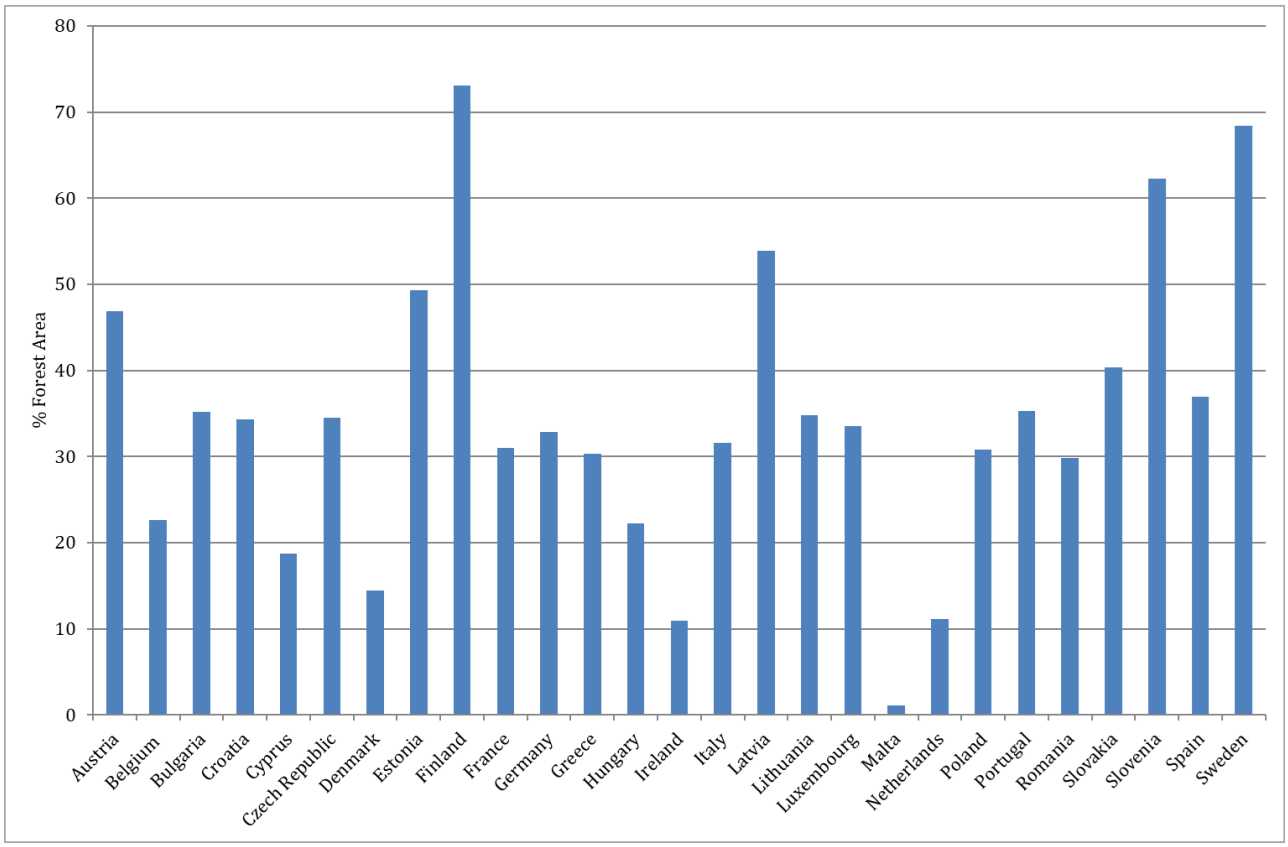

Figure 43: Forest cover in EU 27 (Source: State of Europe's Forests 2020)

10.2 Forest comparison: EU 27

The *State of Europe's Forests* reports on the status and trends in European forests and offers a comparison of Irish forests with European counterparts. In 2020 at the time of the latest report, public forest ownership in Ireland was at 54%, close to the EU average of 53.5% (Figure 44). Due to afforestation, the proportion of privately owned forest is increasing in Ireland. Germany has the highest total growing stock of the EU 27, at over 3.6 billion m^3 (Figure 45).

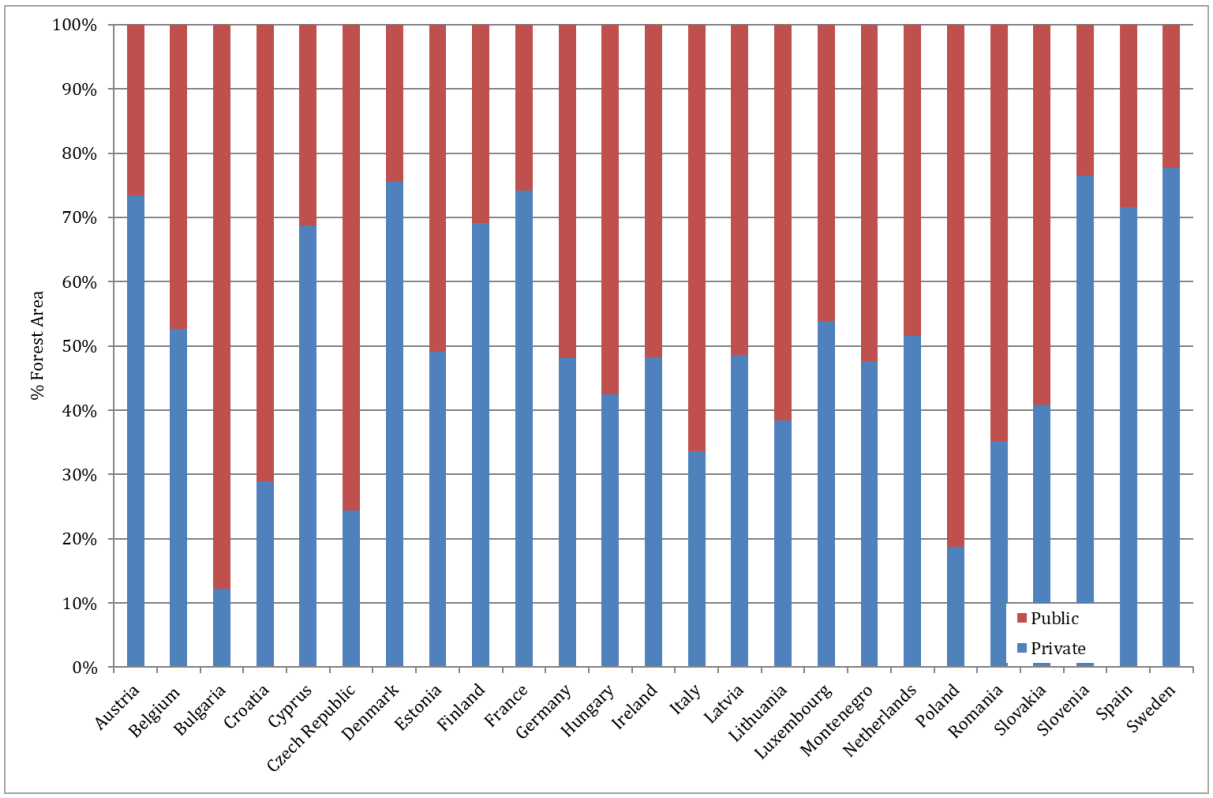

Figure 44: Forest ownership in the EU 27 (*State of Europe's Forests 2020*)

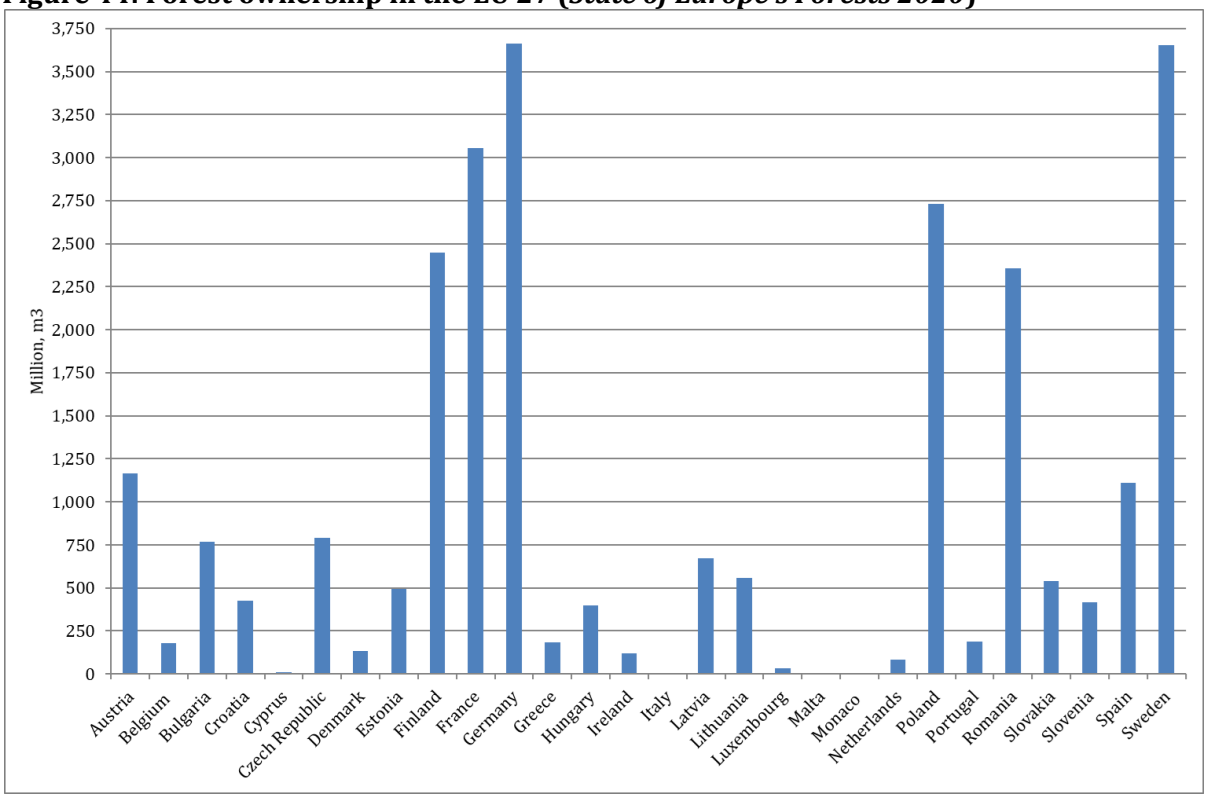

Figure 45: Growing stock in the EU 27 countries (*State of Europe's Forests 2020*)

Annual roundwood harvest at 4.7 million m³ in 2015 compares with an EU average of 21.8 million m³ in the same year (Figure 46). Fellings represented at 64.5% of annual increment in 2015, which was slightly below the EU average of 66.8% (Figure 47). Please note that the State of Europe's Forests 2020 only includes reports on these metrics up to 2015.

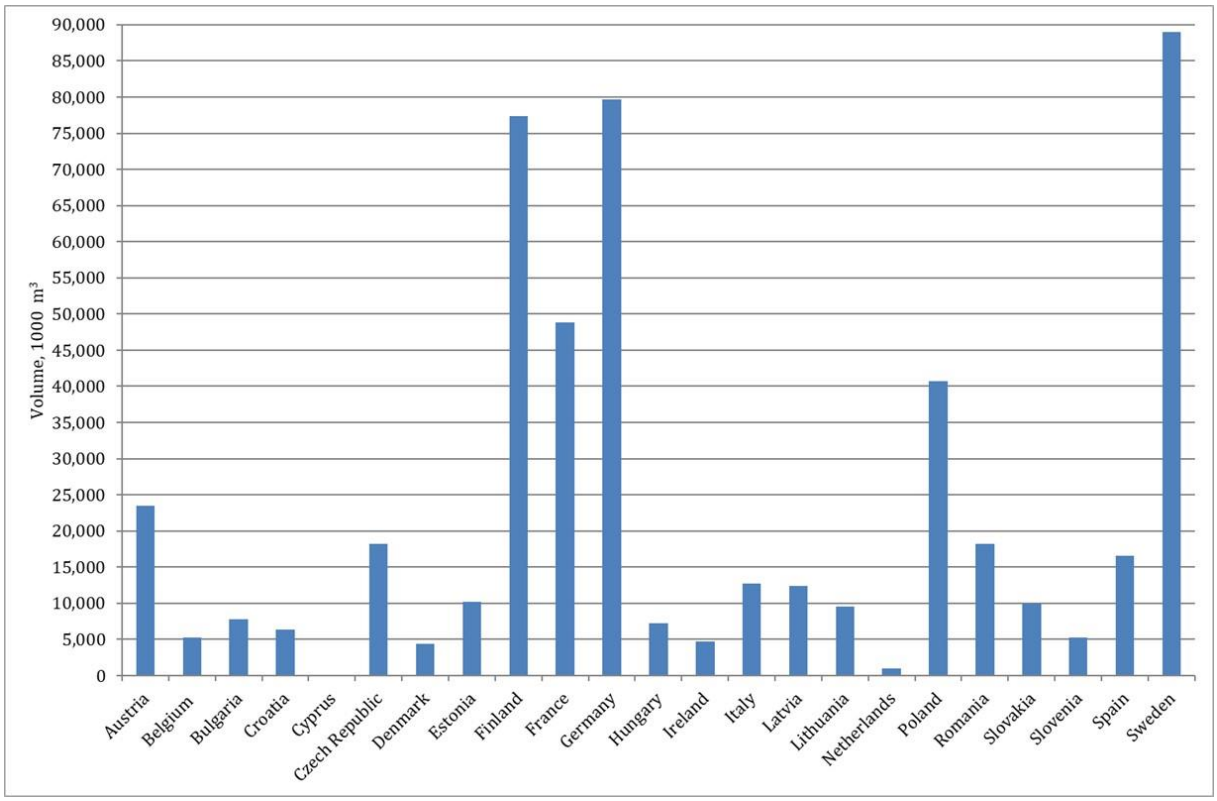

Figure 46: Felling volumes in the EU 27 (*State of Europe's Forests 2020*)

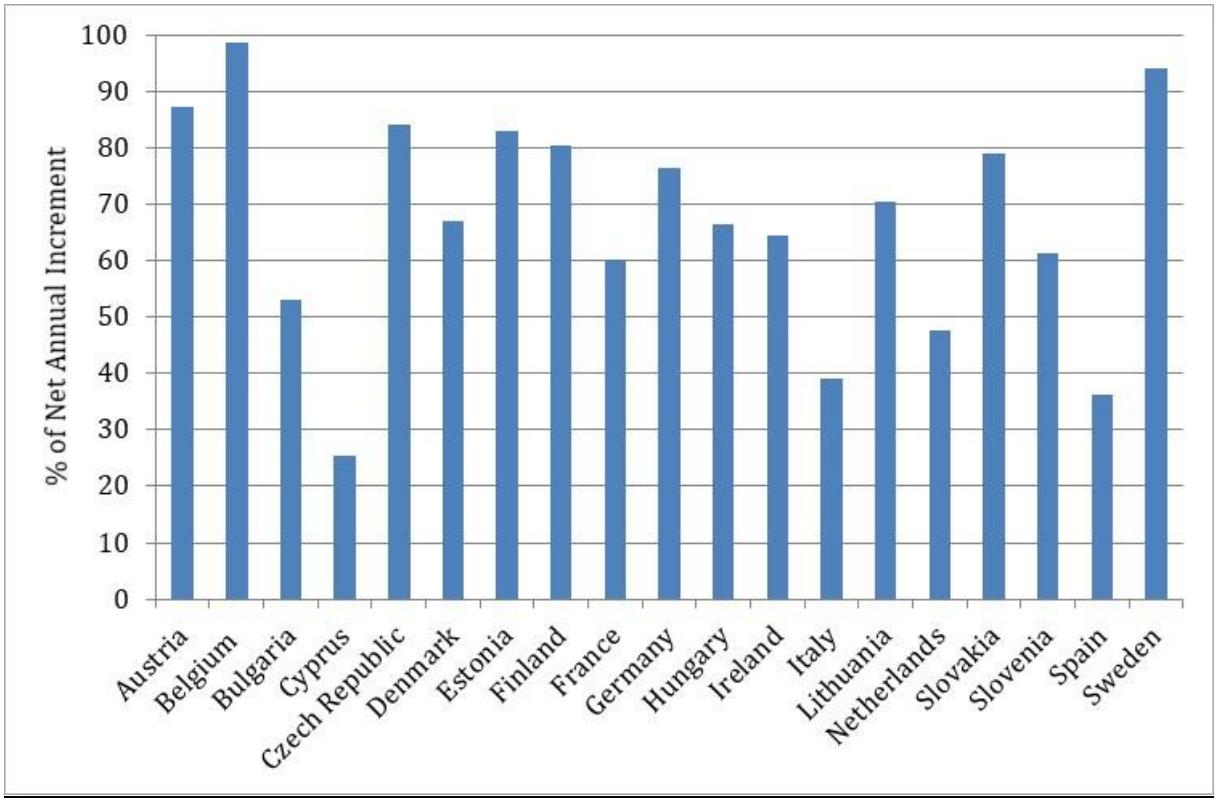

Figure 47: Harvest as a percentage of net annual increment (*State of Europe's Forests 2020*)

10.3 European Forest Expansion Rate

According to the *State of Europe's Forests 2020* report, since 1990 Spain has had the greatest annual expansion of forests at 156,000 ha, France at 94,000 ha and Turkey at 81,000 ha. The annual rate of change, expressed as a percentage of total forest area is highest for Iceland (3.7%), Ireland (1.8%) and Spain (1.0%) for the period 1990-2020 (Figure 48).

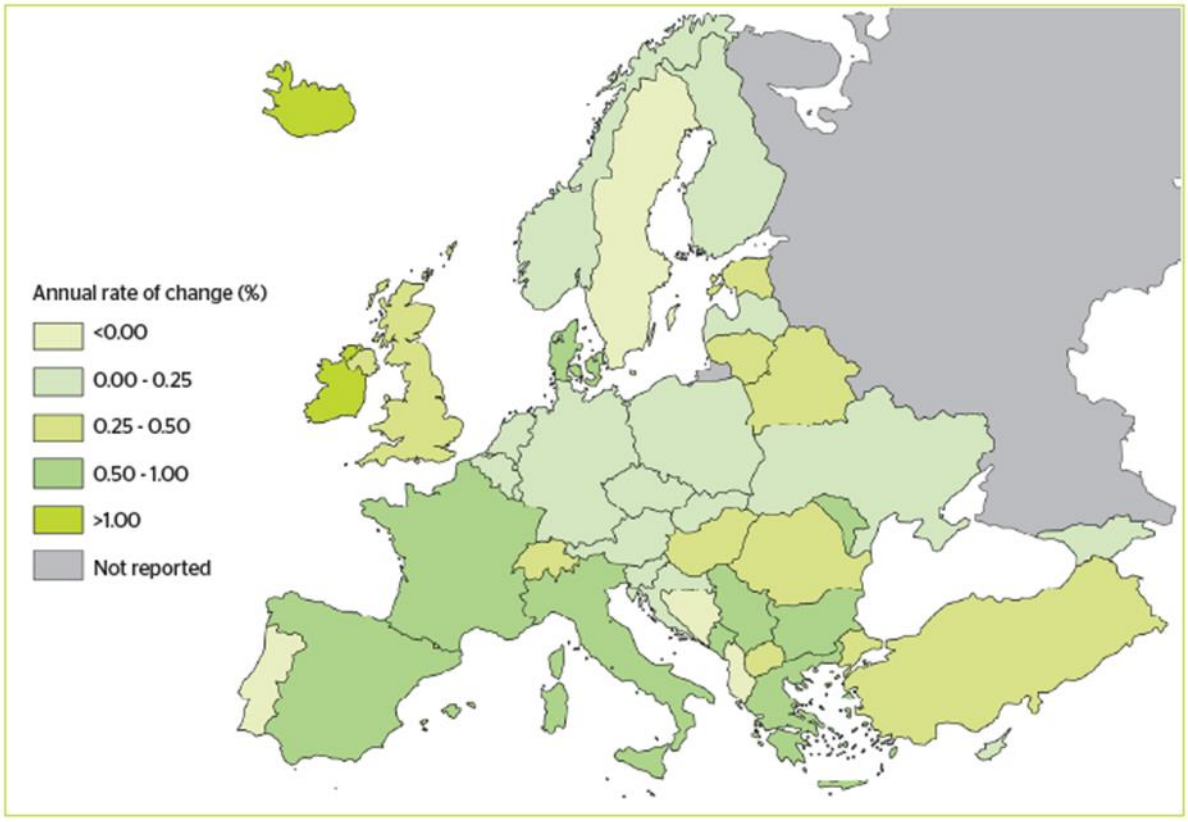

Figure 48: Annual rate of change (%) in forest area by country 1990-2020 (*State of Europe's Forests 2020)*

NOTES

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