

National Forest Inventory Woodland Area Statistics: Wales

17 March 2011

This publication contains initial provisional statistics for Wales on:

- Woodland area at 31 March 2010; and
- Areas of new planting and woodland loss for 1997-98 to 2009-10.

The woodland area statistics in this release make use of the 2010 National Forest Inventory map and woodland grant maps for 1989-90 to 2009-10.

The main findings are:

- The area of woodland in Wales at 31 March 2010 is estimated to be 303.5 thousand hectares. This is 14.3% of the total land area in Wales.
- The estimate of 303.5 thousand hectares of woodland in Wales at 31 March 2010 is around 20 thousand hectares more than the previously published estimate for 2010.

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Area of Woodland at March 2010

The total area of woodland in Wales is estimated to be 303.5 thousand hectares. This is 14.3% of the total land area in Wales.

This compares with the Forestry Commission's previous estimate of woodland area in Wales, for the same reference date of March 2010, of 284 thousand hectares (as published in Forestry Statistics 2010). Further information on the differences between these two figures is provided in the Comparison of Woodland Area Figures section.

New Planting

New planting is the creation of new areas of woodland.

Table 1 shows the area of new woodland reported to have been created in the period between the last National Inventory of Woodlands and Trees (NIWT) and the National Forest Inventory (NFI) (1997-98 to 2009-10). The table also shows the area of new woodland reported for the 8 years preceding NIWT (1989-90 to 1996-97).

Table 1: Areas of new planting, 1989-90 to 2009-10

	thousand hectares		
	1989-90 to 1996-97	1997-98 to 2009-10	Total
Grant-aided new planting	3.9	5.2	9.1
Non grant aided new planting	0.0	0.0	0.0
Forestry Commission new planting	0.2	0.0	0.2
Total reported new planting	4.1	5.3	9.3
Less new planting areas of less than 0.5 hectares			0.6
Total reported new planting (0.5 hectares or more)			8.7

Source: Forestry Commission, grant schemes.

Notes:

1. Of the 8.7 thousand hectares of woodlands of 0.5 hectares or more that were reported as planted in Wales between 1989-90 and 2009-10, 4.6 thousand hectares are visible (based on 2006 aerial photography).
2. The difference between reported planting and observed planting may be due to young trees not being visible in aerial photography of the mapped areas of reported planting and also possibly to areas of planting that have failed. The non visible area is treated as 'assumed woodland' in the NFI map and figures.
3. Non-FC planting that is not grant aided will only be included in the NFI map once it is visible in the photography, as there is no spatial record. This may lead to under-representation of non grant-aided new woods younger than 10 years old.

Woodland Loss

Woodland loss is defined here as an identifiable permanent removal of woodland cover to change the land use. Changes that leave the area as an open non-woodland habitat are not included until the permanent loss of minimum tree cover is established, which can take up to 10 years.

At present, estimates of woodland loss are based on examination of areas of difference greater than 5 hectares between the NIWT map and the NFI map, and are liable to be revised upward when smaller areas of difference are examined. Areas where the process of habitat restoration (conversion of woodland to non-woodland semi-natural habitat) has begun but is not yet complete are not included in these woodland loss statistics, because it is not yet certain that the conversion from woodland will be achieved. For further information on woodland loss see the section on background and definitions.

The total area of woodland loss identified to date in Wales from 1997-98 to 2009-10 is 133 hectares (table 2).

Table 2: Area of woodland loss, 1997-98 to 2009-10

	hectares
Land use change	Total identified woodland loss
Quarry	52
Golf course	33
Residential buildings	25
Urbanisation	13
Wind farm	6
Agriculture	5
Other	1
All Woodland loss	133

Source: National Forest Inventory map, National Inventory of Woodland and Trees map.

Note:

1. Woodland loss figures are derived from areas that have been identified as a permanent land use change, such as conversion to buildings, urban etc.
2. Areas declared as woodland loss have been verified by direct comparison between current aerial photography and 1990's aerial photography, at present limited to differences of more than 5 hectares.
3. For woodland loss to be declared, tree cover must be reduced to less than 20% (or the potential to achieve 20%) of the area assessed.

Comparison of Woodland Area Figures

The area of woodland at 31 March 2010 is estimated to be 303.5 thousand hectares according to the National Forest Inventory (NFI). This represents 14.3% of the total land area in Wales.

The NFI provisional figures are derived from a 2006 base map, together with information on areas of new planting from grant schemes, and some later photography. Additionally 2007 and 2009 remote sensing was used for quality assurance purposes to check the overall woodland area. The NFI woodland area refers to woodland of over 0.5 hectares in extent.

Table 3 shows how the NFI area estimate for 2010 was derived, using information from other sources to augment the initial map, which was solely based on an assessment of the 2006 aerial photography.

Table 3: NFI area 2010

thousands of hectares	
	Woodland area
NFI area as initially mapped, using 2006 aerial photography	297.9
Plus assumed new woodland planted from 1989-90 to 1996-97	+0.6
Plus assumed new woodland planted from 1997-98 to 2009-10	+3.9
Plus verified errors in NFI map from comparison with NIWT over 5 hectares	+1.1
NFI area in 2010 as now estimated	303.5

Source: National Forest Inventory map, grant schemes, National Inventory of Woodland and Trees map.

Comparison between NIWT 1997 and NFI 2010 estimates of woodland area

The National Inventory of Woodland and Trees (NIWT) for 1997 estimated a total woodland area of 286.8 thousand hectares. To help understand the difference from the National Forestry Inventory area in 2010, the Inventory team has undertaken a study to compare the NFI map with the NIWT map to identify the principal causes of the difference. A direct comparison of where NIWT and NFI found woodland has been made. This located areas that NIWT identified as woodland but NFI did not (27 thousand hectares referred to as "NFI unmapped") and areas that NFI identified as woodland that NIWT did not (21 thousand hectares referred to as "NIWT unmapped"). Detailed analysis of areas of difference of 5 hectares or more for each of these classes was undertaken to investigate the causes of these differences. Further information can be found in the Background and Definitions section.

This work has concluded that most of the differences are a result of the limitations in previous technology that led to NIWT under-reporting woodland area.

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The analysis undertaken to date generated a number of revisions that could be applied to NIWT data to give revised area estimates under NFI definitions, processes and technologies. Adjustments for methodology changes and corrections give a revised estimate of 284.0 thousand hectares for 1997 (table 4).

After accounting for confirmed woodland gain and loss between 1997 and 2010 (shown in Tables 1 and 2), there is a remaining discrepancy of 14.8 thousand hectares to reconcile. This is the difference between the 1997 estimate from NIWT (updated to 2010) and the 2010 estimate from NFI. Analysis to date of the differences between NIWT and NFI areas have revealed that this discrepancy comprises:

- A large proportion of a 7.6 thousand hectares difference in NFI and NIWT estimates of the area of small woods between 0.5 and 2.0 hectares.
- Other differences contained in the "NIWT unmapped" and "NFI unmapped" that have yet to be examined. Based on partial analysis of these areas to date, it is likely that the remainder will be mainly composed of woodlands missed by NIWT in 1997.

Table 4: NIWT-based woodland area as at 1997

	thousand hectares
	Woodland area
NIWT: Woodland area, 1997 (as reported)	286.8
Less small woods (0.1 to 0.5 hectares)	-3.0
Less small open spaces (0.5 to 1.0 hectares)	-0.7
Less other identified differences in methodology	-0.6
Adjusted total due to methodology differences	282.5
Less non woodland incorrectly classed as woodland in NIWT	-1.7
Plus woodland identified by NFI, but not included in NIWT	3.2
NIWT: Woodland area, 1997 (under NFI definitions and corrections)	284.0

Source: National Inventory of Woodland and Trees, National Forest Inventory map.

Comparison between 2010 estimates

The above comparison of woodland areas identified by NIWT and NFI accounts for some of the difference of 19.5 thousand hectares between the previous Forestry Commission estimate of woodland area at March 2010 of 284 thousand hectares and that of the current estimate of 303.5 thousand hectares, based on the NFI map.

The previously published estimate of woodland area at 2010 was based on annual updating of areas from the NIWT map (for non-FC woodland) and data from administrative sources (the Forestry Commission sub-compartment database, for FC woodland). The difference in the Forestry Commission woodland area estimates for 2010 between the NIWT-based and FC administrative data sources is 7.9 thousand hectares. This will also account for some of the discrepancy between the overall woodland area estimates for 2010.

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Further work on the examination of areas of difference between NIWT and NFI will bring further clarity to these comparisons, and will result in future adjustments to both NIWT and NFI confirmed woodland areas.

Background and Definitions

Area of woodland:

For the National Forest Inventory, woodland is defined as areas with a canopy cover of 20% or more (or the potential to achieve this), with a minimum area of 0.5 hectares and width of 20 metres.

For the National Inventory of Woodland and Trees, woodland is defined as areas with a canopy cover of 20% or more (or the potential to achieve this) and over 50 metres in width. The NIWT woodland map aimed to include all areas satisfying this definition and with a minimum area of 2.0 hectares or over. Woodland area from 0.1 hectares to 2.0 hectares was derived from the Survey of Small Woods and Trees.

The National Forest Inventory woodland area statistics include areas of less than 0.5 hectares of open space within woodlands as part of the total woodland area, being considered as an integral part of the woodland ecosystem. Areas greater than 0.5 hectares of open space are excluded from the figures.

For the National Inventory of Woodland and Trees, woodland area statistics include areas of open space within woodlands of less than 1.0 hectares as part of the total woodland area. Areas greater than 1.0 hectares of open space are excluded from the figures.

Orchards and nurseries are not included in woodland area estimates.

Further information on the methodology used in the National Forest Inventory and in the National Inventory of Woodland and Trees is available at www.forestry.gov.uk/inventory.

In the previously published estimates of woodland area at March 2010 (Forestry Statistics 2010), the area of Forestry Commission woodland was derived from the FC's administrative systems, rather than NIWT data. They were based on land use codes in the Forestry Commission's sub-compartment database, identifying either whole mapped woodland sub-compartments or the percentage of each sub-compartment that is recorded as woodland. This resulted in the exclusion of all minor open space within woodlands and the immediate exclusion of areas cleared to create open space (e.g. natural habitat restoration and wind farm areas).

The NFI sample square fieldwork programme will measure and report upon any changes in basal area, woodland stocking, species composition etc. that arise through habitat restoration work. This will give more information on change in woodland composition over time.

NFI woodland figures for Wales are based on data obtained from the 2010 National Forest Inventory map and takes account of new planting. At present no adjustments have been made for land that has been grant aided to establish woodland, but which may have failed to achieve woodland cover.

New planting:

New planting is the creation of new areas of woodland. New planting can occur as a result of planting/ seeding or natural colonisation/ regeneration. The figures here are for all types of woodland.

Information about Forestry Commission new planting comes from administrative systems. Non-Forestry Commission information comes principally from grant schemes: the Woodland Grant Scheme (WGS) and Better Woodlands for Wales (BWW). For natural colonisation/ regeneration, the areas are generally those for which the second instalment of grant has been paid during the year – the second instalment is approved when woodland reaches a certain stage and density of growth, so this information corresponds approximately to the amount of new woodland created.

The National Forest Inventory aerial photography interpretation has picked up a proportion of the new woodland creation, but this initially under-records the amount of woodland created between 1997-98 and 2009-10, as the technology often fails to detect stands of trees younger than 5 to 10 years. Once trees are 10 to 15 years old they are normally large enough to be identified by remote sensing methods and will be included in the overall woodland area figures. Because of this factor, NFI, NIWT and annual estimates of woodland area have assumed that grant aided new planting achieved canopy cover. NFI now has a category of 'assumed woodland' to cover such new woods. These woods will be monitored using remote sensing to confirm if they have achieved a canopy cover by their 10th year. If they have not, they will be removed from the woodland area.

Woodland loss:

If an area of woodland is clear felled, it is presumed that tree cover will be replaced. A period of 10 years is allowed for trees to be re-established before such an area is mapped as non woodland, unless an obvious and permanent land use change is detected. Areas of clearfell that have occurred over the last 10 years that show no definitive photographic evidence of land use change to non-woodland are included in the NFI woodland area and classified as transition woodlands. This is to allow for the usual period of time it takes for woodland to re-establish and for the difficulties associated with detecting young trees from aerial photography and satellite imagery. Where woodland is clear felled and converted to non-woodland land uses that are immediately identifiable by remote imagery, such as quarries or golf courses, these areas will be reported as woodland loss.

The principal exception to the presumption of tree cover being replaced after felling is that of habitat restoration, where owners remove tree cover to establish non woodland habitats and land uses. The NFI rule is that until such new non forest land uses are well established, they are not declared as woodland loss. The same principle is used as when assessing the failure of new woodland establishment; a ten year period is allowed before a land use change is assessed and declared. This procedure provides greater assurance that only areas of definite and permanent change are included in woodland loss statistics.

Forestry Commission Wales have undertaken action between 1997-98 and 2009-10 intended to restore around 3 thousand hectares of such habitat.

Comparison of NIWT map and NFI map:

The National Forestry Inventory team is undertaking a study, comparing the NFI map with the NIWT map to identify the principal causes of the difference between the two maps. A direct comparison of where NIWT found woodland and where NFI found woodland has been made. This located areas that NIWT identified as woodland whereas NFI did not (27 thousand hectares referred to as "NFI unmapped") and areas that NFI identified as woodland that NIWT did not (21 thousand hectares referred to as "NIWT unmapped"). Detailed analysis of each of these classes is being undertaken by examination of historic aerial photography, verifying which of the maps is correct, or if differences are real changes over time.

Of the 27 thousand hectares of "NFI unmapped" areas, all areas of over 5 hectares have been assessed, totalling 4 thousand hectares. The remaining 23 thousand hectares of "NFI unmapped" areas (differences of 2 to 5 hectares) have not yet been analysed. From the 4 thousand hectares that have been studied, around 1.1 thousand hectares are assessed as valid woodland (mostly comprised of new planting schemes) and have been added to the total NFI area, and 133 hectares have been identified as woodland loss. Most of the remaining 3 thousand hectares were identified as areas where NIWT was incorrect and woodland had never existed.

Of the 21 thousand hectares of "NIWT unmapped" areas, 65% of areas of over 5 hectares have been assessed, totalling 5.7 thousand hectares. The remaining 15.3 thousand hectares of "NIWT unmapped" areas have not yet been analysed. From the 5.7 thousand hectares that have been studied, around 3.2 thousand hectares are assessed as existing woodland that should have been included in NIWT. This estimate will be refined further in 2011/12.

Further information:

Previous statistics on woodland area and planting are available at www.forestry.gov.uk/statistics, including Forestry Statistics 2010 (September 2010) and Forestry Facts & Figures 2010 (September 2010). Forestry Statistics 2010 also contains additional information about the sources and methodology used.

For further information on the NFI, including contact details, please visit www.forestry.gov.uk/inventory. Copies of this report together with accompanying A4 map and underlying GIS data are available from the above URL under the 'Data and Inventory outputs' link.

Please note that the figures are currently provisional. We are aware of very minor differences between the figures in this release and the total area in the underlying GIS data.

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Figures for woodland area in 2010 and earlier years will be subject to revision as further results become available from the National Forest Inventory.

Official Statistics:

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Figures in tables have been independently rounded, so may not add to the totals shown.