



Llywodraeth Cymru
Welsh Government

Woodlands for Wales

**The Welsh Government's Strategy
for Woodlands and Trees**

Photographs

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Cover Photograph

Coed y Brenin

Mae'r ddogfen yma hefyd ar gael yn Gymraeg. / This document is also available in Welsh.

Minister's Foreword



I welcome the bold ambition this Strategy sets out. It matches the diversity of opportunity our woodlands and trees offer and the essential part they play in our lives. Provided they are managed carefully and sustainably, they provide shelter for livestock, reduce noise pollution, slow down flood waters and improve air, soil and water quality. They are havens for biodiversity and provide a wealth of recreational opportunities and a means of improving our general health and well-being.

The timber and non-timber products from our woodlands are key renewable resources which contribute to prosperity for all. We need more of them, to aid the sustainability of our industries and to contribute to a circular economy.

To deliver prosperity for all, we must plant more trees. This Strategy sets out a clear vision for the kind of trees and woodlands we want. It sets out our policies for woodland very clearly and will enable us to make informed choices about where to plant the new woodlands and trees we need.

I am determined the Welsh Government steps up to the challenges which the Strategy describes. I welcome the continuing advice from the Climate Change, Environment and Rural Affairs Committee and I am grateful to the Woodland Strategy Advisory Panel who have co-produced the Strategy.

I know we best achieve our ambitions for our people, our communities and our country by working together in Wales. Looking ahead, I want to see close collaboration between the Welsh Government, Natural Resources Wales and our partners and stakeholders to deliver the ambitions we describe here.

We face unprecedented change to our rural communities as we leave the European Union. In the face of that uncertainty it is really important that we are clear about our ambition and our goals for woodlands and trees. This Strategy is a vital benchmark against which we can check the progress we are making as we develop new approaches to support for land use.

At the start of this millennium, the Welsh Government set out a long term vision for Welsh woodland. Our vision, set out in this Strategy has stood the test of the last 18 years and I commend it to you once again. It is for all of us working, living, learning and visiting Welsh woodlands to make sure it becomes reality.

A handwritten signature in black ink that reads "Hannah Blythyn".

Hannah Blythyn
Minister for Environment



Betws y Coed from Clogwyn Cyrau

1. Introduction

The first *Woodlands for Wales* strategy was published in 2001 and has now set the strategic direction for Welsh forestry for nearly 20 years. Over that time a strong consensus has emerged that the vision set out in the strategy is sound and that woodlands and trees are vital in sustaining the wider environment, in providing opportunities for people and communities and in improving the lives of everyone in Wales.

With the development of the second edition of the strategy, came the increased recognition of the threat from climate change and the publication in 2006 of the Wales Environment Strategy. The failure to achieve commitments under the Convention on Biological Diversity (CBD) and to improve the condition of the environment in Wales led Welsh Government to carry out a strategic review of our approach through the Living Wales Programme, which ran from 2012 to 2013. This culminated in the establishment of a new organisation, Natural Resources Wales, which drew together most of the functions in Wales of the Environment Agency, the Countryside Council for Wales and the Forestry Commission. The National Assembly then passed two landmark pieces of legislation, the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016.

So it is now time to make sure that *Woodlands for Wales* and the long term vision it describes, is truly fit for the future and can be taken forward with confidence through this new legislative framework.

This edition of *Woodlands for Wales* is refreshed and updated in the light of our new Natural Resources Policy but keeps the core elements of the strategy in place. They have been robust and do not need significant change. Instead we have concentrated on reviewing the evidence which lies behind

the policies set out in this strategy. We have also refreshed and updated the chapter on delivery. We have removed outdated references and information and explained how we intend to deliver these policies in future.

Soon after the last edition went to press, Welsh Ministers committed to an ambitious policy to increase the area of woodland to provide even more services for the people of Wales. Delivering this increase in woodland area has proved challenging.

Our policy on this remains clear. There is a strong case for woodland expansion and for good woodland management. This strategy sets out the kind of woodland we want, building on the priorities in our Natural Resources Policy which include supporting the development of resilient ecological networks to maintain and enhance the resilience of Wales' ecosystems and increased canopy cover and well located woodland, for example close to towns and cities where it will have the greatest recreational and ecosystem service value. The strategy describes the outcomes we want from our woodlands and is a key building block that will guide us as to how and where to achieve them. Our aim is to achieve at least the minimum planting rate of 2,000ha each year from 2020 which has been recommended to us by the UK Climate Change Committee and over time to increase planting to levels that enable Wales to deliver the legal obligation we entered into with the Environment (Wales) Act 2016 to reduce emissions by 80% from their pre-1990 levels by 2050.

Since the second edition, it has become even clearer that woodlands have a key role in replacing fossil fuels, storing carbon and helping us to cope with the effects of a changing climate.

It describes the kind of woodland we want to see, and the evidence for the benefits that woodland will provide. It seeks as before, to broaden people's engagement with woodlands and trees, to ensure that the full range of opportunities and services is accessible to all sections of society in an equitable way.

Our vision in 2018 for what we are trying to achieve through this 50-year strategy remains the same as it was in 2001. It is that:

'Wales will be known for its high-quality woodlands that enhance the landscape, are appropriate to local conditions and have a diverse mixture of species and habitats. These will:

- **provide real social and community benefits, both locally and nationally;**
- **support thriving woodland-based industries; and**
- **contribute to a better quality environment throughout Wales.'**

The Well-being Act and the Environment Act set out the Well-being Goals and Principles for the sustainable management of natural resources, which provide a framework for government decision-making and from now on and will underpin everything we and the wider public service do. *Woodlands for Wales* now fits into this wider framework. It remains focussed on Welsh woodlands and trees as a foundation, from which to deliver four strategic themes which are linked to the Well-being Goals and Principles:

- **Responding to climate change** – coping with climate change, and helping to reduce our carbon footprint; helping make Wales an innovative, productive and low carbon society which recognises the limits of the global environment.

- **Woodlands for people** – serving local needs for health, education, and jobs; enabling Wales to be a society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood; that enables people to fulfil their potential no matter what their background or circumstances; and that we enjoy attractive, viable, safe and well-connected communities.
- **A competitive and integrated forest sector** – innovative, skilled industries supplying renewable products from Wales; helping Wales to develop a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.
- **Environmental quality** – making a positive contribution to biodiversity, landscapes and heritage, and reducing other environmental pressures; so that we are a nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).

Woodlands and trees can, and do, deliver these benefits, at the same time and in the same place. We view this as a merit, and this principle of multiple benefits lies at the heart of our strategy.

In the following pages, we set out our 20 high level outcomes covering the foundation of Welsh woodlands and trees and the four strategic themes. We explain why each of these outcomes matters, what we want to see happen and summarise how we plan to achieve these outcomes. In doing so we must now apply the Sustainable Development Principles so that we consider the long-term impacts of our actions, act to prevent environmental damage before it happens, integrate our delivery across Wales, collaborate with others and involve people in their delivery.

A word about Sustainable Forest Management...

The concept of sustainable forest management was developed during the 1980s and in 1993 was defined in the Forest Europe process, to which the UK is a signatory, as:

‘the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems’.

In Wales and throughout the UK this concept is embodied in the UKFS and its associated suite of guidelines and practice guides. The Standard was updated in 2017 and provides a sound foundation that is compatible with the sustainable management of natural resources. This new edition of *Woodlands for Wales* builds on these concepts of sustainability and sets out our woodland policy framework for Wales.



Woodland Landscape

2. Welsh woodlands and trees

Woodlands for Wales concerns all the woodlands that exist in Wales now, and those that will be created in the future, irrespective of size, location or ownership, together with all the trees outside woodland, in both rural and urban areas. Collectively these woodlands and trees make up the Welsh forest resource, which can be used and developed to meet the social, cultural, economic and environmental needs of Wales and its people.

Wales is one of the least wooded countries in Europe, with woodland covering only 15% of the land area, compared to the EU average of 38%. The character of woodland in Wales has been influenced by both historic land use and previous government policy, and now most woodland is either:

- predominantly conifer woodland, with a mixture of:
 - stands that are undergoing transformation and restoration to diversify species and structure;
 - single-species, even-aged stands created during the twentieth century, which generally have been managed by clearfelling and are currently the main source of home-grown timber;

or

- native woodland, mostly small and fragmented, often on farms and much of it not actively managed. Not all native woodland is old, but a significant proportion has been continuously wooded for at least 400 years (including some that was more recently converted to non-native planted woodland). This ancient woodland is irreplaceable.

We, the Welsh Government, own almost two-thirds of the conifer woodland (including planted woodland on ancient woodland sites), and one fifth of the native woodland and a smaller proportion of the ancient semi-natural woodland.

There are estimated to be an additional 92,700 hectares of tree cover outside woodlands in Wales. More than half of this comprises trees growing along linear features like hedgerows, riverbanks and roadsides, while the rest is made up of trees found in orchards, parks, wood pastures and urban areas.

Woodlands and trees are the foundation to support all the other themes of *Woodlands for Wales*. Their nature, quality, distribution and management underpins the whole strategy, and we have identified six key outcomes to strengthen this foundation and ensure that it will be fit to meet the needs of Wales for the next 50 years:

- More woodlands and trees are managed sustainably.
- Woodland ecosystems are healthy and resilient.
- Woodlands are better adapted to deliver a full range of benefits.
- Woodland cover in Wales increases.
- The management of woodland and trees is more closely related to that of other land uses.
- Urban woodlands and trees deliver a full range of benefits.

Figure 1: Woodland Ownership 2016

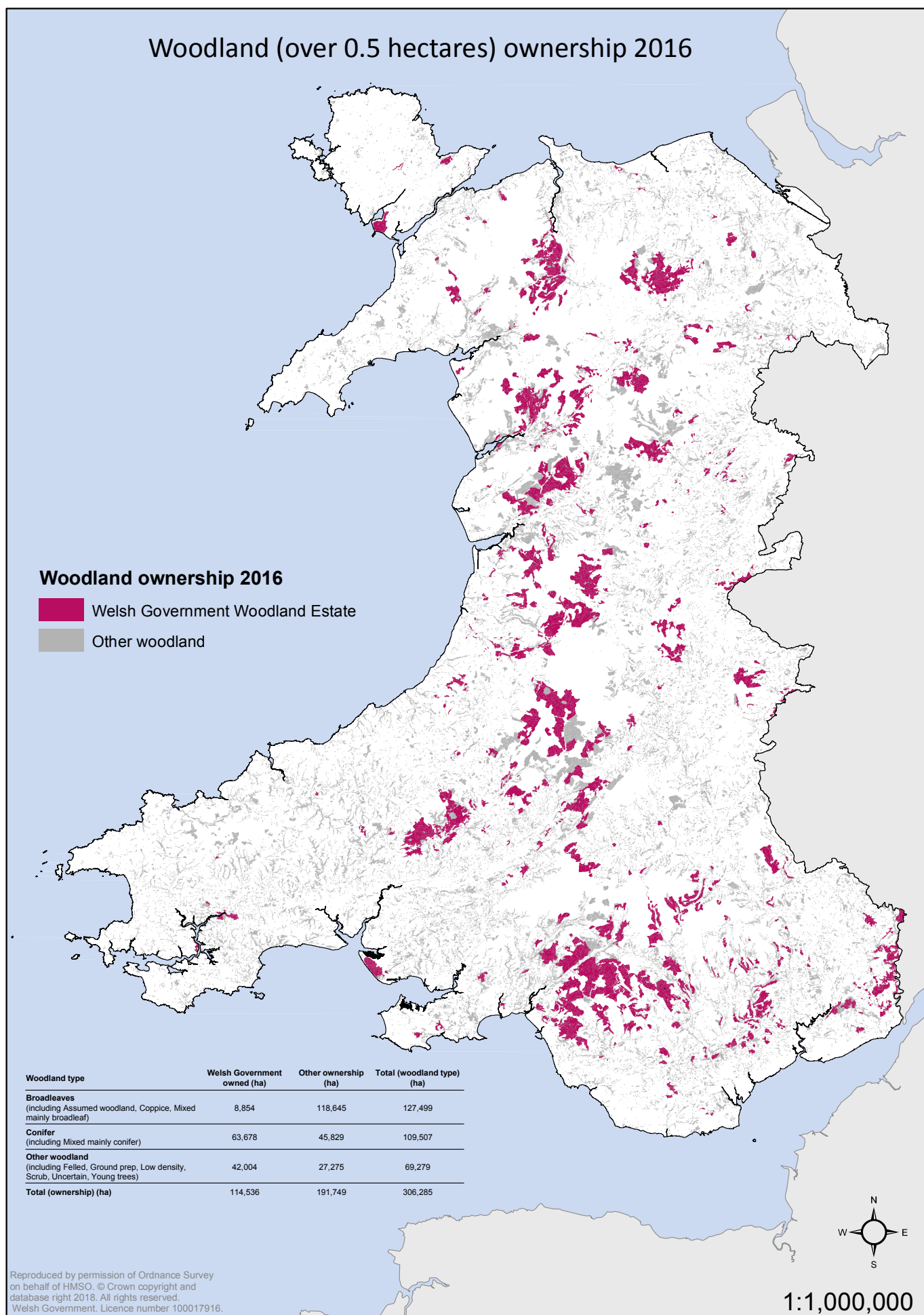
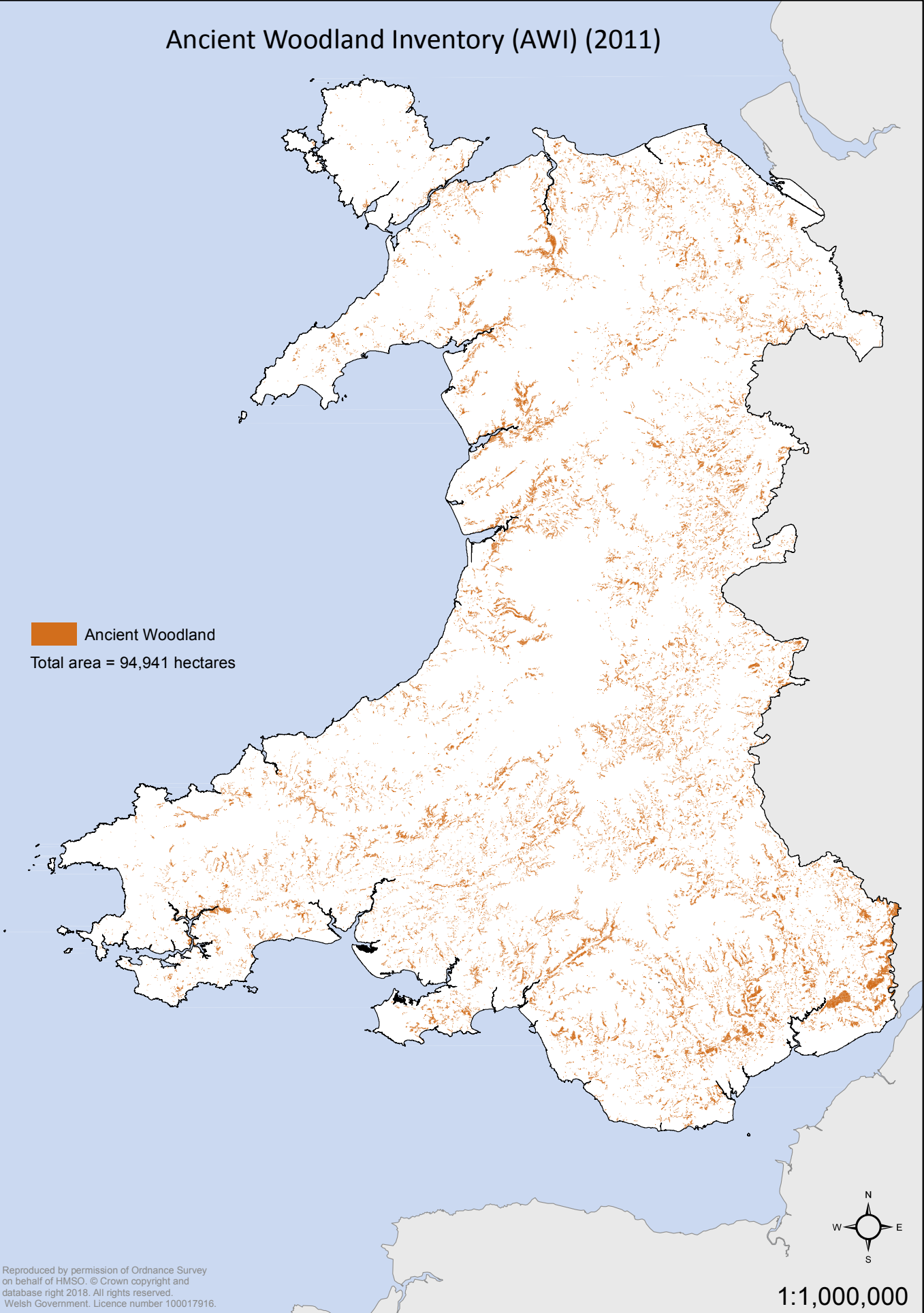


Figure 2: Ancient Woodland



2.1 Woodland cover in Wales increases

The total area of woodland in Wales has changed little in the past 30 years, and the average 100 hectares or so of new native woodland planted each year barely balances the area of woodland permanently removed for habitat restoration or in the course of approved development. The measures we shall take to ensure woodland health and resilience, and those to restore priority habitats, will reduce the productive potential of some woodland at a local scale. To help mitigate this impact, we wish to see woodland cover increase at a national scale. By increasing woodland cover at a steady rate in the future, we will demonstrate our commitment to the important strategic objective of ensuring that the overall productive potential of Welsh woodlands is maintained.

More woodland cover is also needed to help build the resilience of our ecosystems and provide the full range of ecosystem services and community benefits envisaged in this strategy, and to deliver woodland's contribution to our policies for the environment and the well-being of future generations. The totality of this new woodland must be genuinely multi-purpose, requiring careful design and establishment. How much

new land is offered for woodland creation will be influenced by the long-term effects of changes in farm support payments, and the extent to which we are able to 'buy' ecosystem and community services from landowners. Ensuring that woodland cover increases also means reducing the unnecessary, and occasionally illegal, removal of woodland.

Woodland creation will often happen through active planting. However much of Wales would naturally regenerate with woodland if natural processes were allowed to take place. We will consider how and where we can encourage greater use of natural processes over time to expand woodland and tree cover. We will also seek to monitor changes more frequently and to deploy new technologies to support this effort.

An increase in woodland cover is now essential to delivery of the climate change and decarbonisation obligations we set out more fully in Chapter 3. For this reason we have included a specific target for increasing woodland cover in Wales.

We intend to ensure that the overall productive potential of woodlands in Wales is maintained at current levels through new woodland creation, and through measures to bring more woodland into management.

This is what we want to happen:

- Woodland cover in Wales increases by at least 2000 hectares per annum from 2020 to 2030 and beyond to meet strategy priorities and to maintain the overall productive potential from Welsh woodlands.
- Tree cover in the wider environment, on farms and the rural landscape and in and around towns and cities should also increase.
- Priority is given to creating both new native and new mixed woodlands that can deliver multiple benefits, and to use of planting and natural processes to do so.
- Woodland creation is guided by the objectives of this strategy and by the need to protect semi-natural habitats, historic features and characteristic landscapes.
- There is a strong presumption against the permanent removal of woodland except for the restoration of high priority open habitats and to meet the requirements of the Environment (Wales) Act. Where this is necessary it is balanced by woodland creation at a national level in line with the priorities of this strategy. Landscape improvement and habitat restoration are preferably achieved through modifying management systems rather than by removing woodland.
- When permanent removal of woodland is permitted for development, the losses in public benefit are offset by compensatory planting and this is reflected in planning policy.
- Information is provided to landowners and communities about our priorities for woodland creation and financial support.
- We want to find ways to ensure that planning policy reflects the need for compensatory planting, when permanent removal of woodland is permitted for development.

2.2 More woodlands and trees are managed sustainably

Delivering this strategy depends on Welsh woodlands being actively and sustainably managed both for timber production and to provide a range of other goods and services. Much still has to be done to reach this goal but in the future we expect that through reformed land management support, there will be new approaches that will encourage sustainable management.

The significant, first step should be that more woodland, including many small and fragmented woodlands, is managed in line with the UKFS. To provide some assurance of this, we would like to see more Welsh woodlands gaining certification against the UK Woodland Assurance Standard (UKWAS).

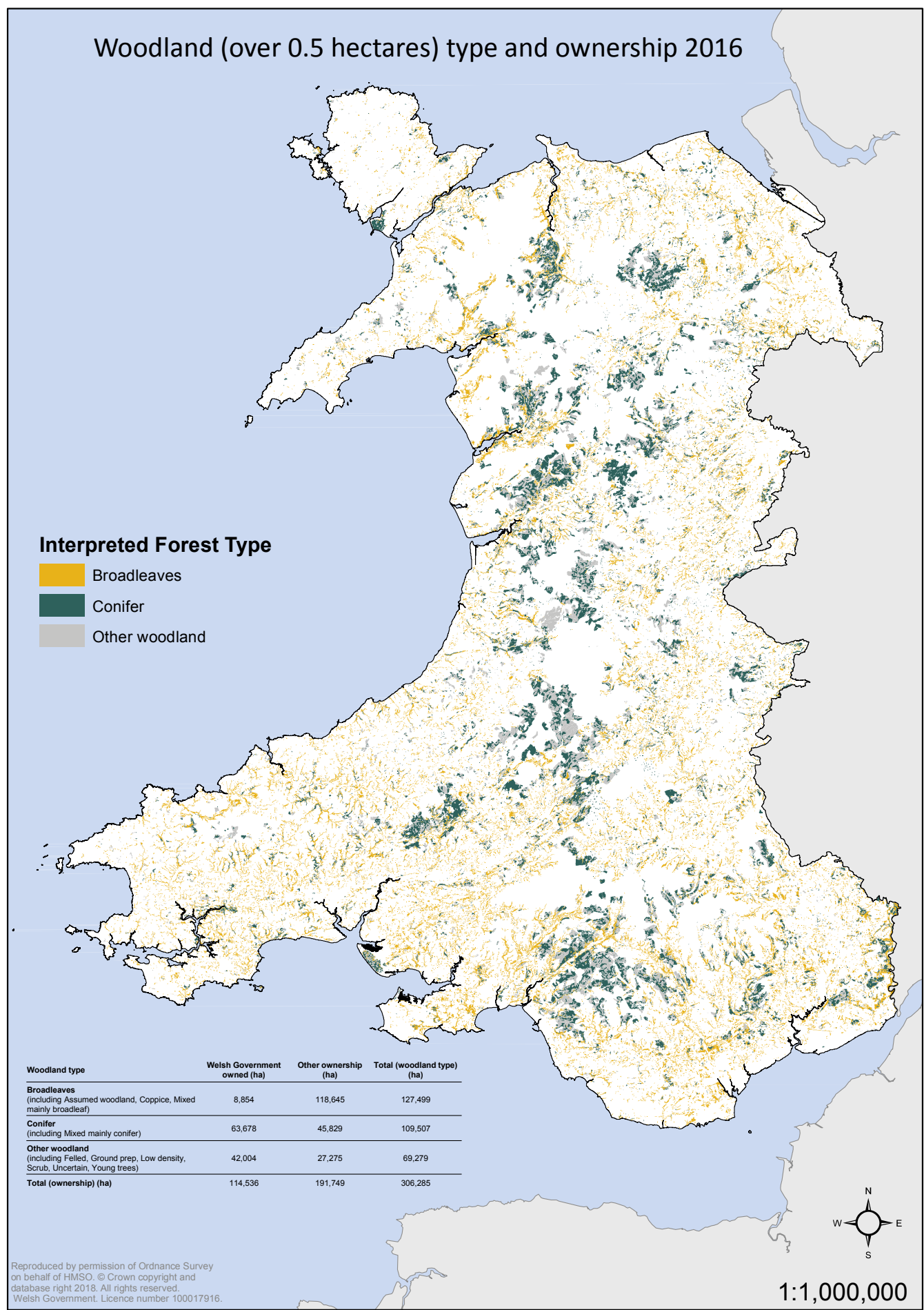
A wide range of measures will be required to achieve this. The Welsh Government's own woodland will continue to be managed in line with the UKFS. NRW will maintain independent third-party certification for their management of the estate through the UKWAS.

The market for woodfuel and the opportunities to add value to Welsh-grown timber can be a catalyst for sustainable woodland management, but this requires initial investment in infrastructure including tracks and fences. In particular, we need to make special efforts to encourage farmers to bring their native and ancient farm woods into formal sustainable management for biodiversity, timber, woodfuel and as key parts of our natural resources.

This is what we want to happen:

- The Welsh Government's own woodlands are managed using the principles of the sustainable management of natural resources and in line with the UKFS by NRW and are independently certified through the UKWAS.
- More woodlands are managed to the UKFS and are capable of producing useable timber and other services.
- More woodlands are certificated to the UKWAS.
- More of the usable timber grown in Welsh woodlands is harvested, and greater value is added to it during processing.
- The development and use of the UKFS, and its associated guidelines, continues to be promoted.
- The benefits of certification to the UKWAS to woodland owners and timber processors are supported and promoted, and improvements in access to certification for small woodland owners is supported where there is a clear benefit to doing so.
- Innovative financial support mechanisms, such as landscape-scale payments for ecosystem services, to increase the economic viability of managing smaller woodland units, are further developed.
- More markets, particularly local ones, are further developed for wood products.

Figure 3: NFI and Ownership



2.3 Woodland ecosystems are healthy and resilient

The health and viability of woodland trees is closely related to that of the whole ecosystem, which in turn is influenced by the structure, species composition, genetic diversity and location of the woodland. To be resilient and capable of delivering our strategy, many Welsh woodland ecosystems, need to be diversified. The positive impacts of diverse, mixed woodlands on ecosystem and landscape quality are well understood.

In the context of *Woodlands for Wales* the objective of diversification is to move away from planted woodland composed of even-aged, single-species stands. Although there has already been a major programme of restructuring the age and diversifying the species composition of our own woodlands over the last 30 years, there is still more to do. Now environmental and social concerns, combined with the risks of climate change and the introduction of new pests and diseases, mean that diversification of these single-age, single-species woodlands is becoming even more important. As the climate changes we can expect a longer growing season, with increased growth and production potential, but also greater risk of winter storm damage and summer drought and fires.

Changes in the pattern of outbreaks of pests and diseases are already presenting an even more serious threat to our woodlands. We therefore propose to continue the effort to diversify our own woodlands, and to encourage others to do the same. We believe this is the best way of reducing risk and meeting the requirements of the Well-being of Future Generations Act – developing a resilient Welsh forest resource capable of delivering society’s aspirations and coping with any future threats from climate change, pests and diseases. We can then focus on ensuring that the production from these more diverse woodlands meets future market

demands and supports a vibrant Welsh timber processing industry.

The nature of diversity will vary and it can be applied at different scales. We are not suggesting that all woodlands will be intimate mixtures of different ages and species, or predominantly native in origin. There is a place for non-native species in diverse and resilient woodland. Some woodlands will require change at a stand level if they are to make a significant contribution to biodiversity or social objectives.

This approach is especially relevant if the objectives for the site can be best achieved by avoiding clearfelling in the future, and by introducing a range of tree species and genetic diversity to widen future management options. For others, more diversity at a whole woodland level will be a better approach, where variations in site potential can be used creatively to establish a wider range of species. Both approaches, when combined strategically at a landscape level, will make a significant contribution to healthier, more resilient and more productive woodland ecosystems.

In practice diversity will be achieved on a site by site basis and will include characteristics such as species, genetic diversity, age, structure and extent of woodland cover. A range of management techniques and silvicultural systems will all play a part in creating diversity and will be matched to site conditions and management objectives. All should have regard to the requirements of the Environment (Wales) Act.

We do understand that more diverse woodlands require more complex management systems, which are less affordable for some woodland owners and managers. We also recognise that the impacts of rising deer and grey squirrel populations will need to be addressed as we move towards greater diversity.

We recognise concerns that some species planted to diversify woodlands may grow more slowly and have poorer market access than better-established species. This is why our support will be needed for these changes, which will deliver public benefit, and it is why we aim to maintain the overall productive potential of Welsh woodlands at a national scale. We intend to do this through our twin strategies of bringing more woodlands into management and increasing woodland cover,

and by supporting initiatives and strategies that increase the economic potential of woodland managed for a range of benefits.

We acknowledge that this represents continuing change for both the timber growing and processing sectors, but we believe that a stronger focus on the health and resilience of woodland ecosystems is essential if the woodlands of Wales are to deliver wider benefits that the people of Wales need.

This is what we want to happen:

- There is appropriate diversification of the age structure and tree species and the genetic base of woodlands, particularly non-native woodlands, at a range of scales and using mechanisms suited to the site and the woodland management objectives.
- Priority is given to native woodland species when restoring planted woodland on ancient woodland sites.
- The negative impacts on woodlands of pests and diseases are addressed.
- The Welsh Government Woodland Estate (WGWE) is managed in order to make it more resilient to climate change, and other woodland owners are encouraged to do the same.
- Implementation of and continual assessment of our Tree Health Strategy in order to improve our ability to deal with present and future outbreaks of woodland pests and diseases.
- Continue to develop strategic approaches for dealing with the impacts of Invasive Non-Native Species on woodlands, such as muntjac and sika deer and grey squirrel.

2.4 Woodlands are better adapted to deliver a full range of benefits

Although the idea of multi-purpose woodland management is widely accepted, the value of all the benefits that woodlands and trees can provide for society is often overlooked. These benefits are collectively known as ecosystem services and include:

- **Provisioning services** – eg wood for a variety of purposes, including renewable energy to replace fossil fuels and as a substitute for more carbon intensive materials such as steel and concrete.
- **Cultural services** – eg recreational, health, aesthetic and spiritual benefits for people living near or visiting woodlands; landscapes, heritage and culture; education.
- **Regulating services** – eg carbon sequestration; protecting water and soil resources within catchments; contributing to the reclamation of contaminated land; providing shelter, shade and cooling in towns, and wind breaks (shelterbelts) on farmland.
- **Supporting services** – eg soil formation, nutrient cycling and oxygen production; biodiversity.

Apart from wood, most of these ecosystem services cannot be sold on the open market but are nevertheless of great importance to the people of Wales, as exemplified by the Well-being of Future Generations Act. The current supply of woodland ecosystem services is limited by three main factors – the nature, character and management of Welsh woodland; the under-management of existing woodland; and lack of woodland in places where it is needed.

Much of the native and mixed woodland in Wales is not actively managed because the income from timber alone is not sufficient to pay for the management work. We believe that more of this important resource would be brought into sustainable management if the costs of providing ecosystem services could be properly reflected in the income from these woodlands. Where the market fails to do so we shall work with others to secure payments for these ecosystem services, and where possible encourage management that enables the harvesting of wood products.

This is what we want to happen:

- Woodlands and individual trees in Wales are valued by their owners and society for the whole range of goods and services provided including timber, fuel, water quality and water management, climate regulation, biodiversity, and improvement of landscapes and access opportunities.
- Decisions about woodland creation and management take full account of all the ecosystem services the woodland could provide, not just the potential for timber production.
- On our own Woodland Estate, use appropriate management approaches to deliver a wider range of ecosystem services, and encourage others to do the same.
- Maintain the volume of timber from our Woodland Estate in the short to medium term to support sustainable development and the Welsh timber processing sector.
- Continue to work with others to develop innovative systems of payments for ecosystem services.

2.5 The management of woodland and trees is more closely related to other land uses

Historically native woodland would have been an integral part of most farms in Wales, carefully managed to provide timber and fuel. Individual and hedgerow trees would also have been important. In far too many instances this functional link has long been lost.

Productive private woodland in Wales is based around the planted conifer woodland established during the twentieth century, which farmers generally saw as an alternative to agriculture, rather than a part of it. The historic structures of support payments for agriculture have sometimes been a disincentive to woodland management or have disqualified farm woodlands from support payments altogether. This created an incentive to overgraze farm woodlands, leading to habitat loss and lack of regeneration. In some cases, landowners who faced loss of support payments because of the tree cover on their farm, have removed farmland trees altogether. There is an

opportunity as we reform land management support systems, to address these perverse incentives.

Much of the planned increase in woodland cover in Wales is likely to come from new woodlands on farmland, providing important ecosystem services. The benefit from woodland creation and better woodland management should flow to Welsh people and Welsh communities. There will be opportunities for commercial investors and others to be involved in creating and managing woodland but this should always be in the context of prosperity for all in Wales. Providing quality services from woodlands is a long-term process which can be best done by those who understand them well.

Woodland creation and tree planting can have an important role in the reclamation of former industrial land and as an integral part of environmental management in urban and industrial developments. For example, there are many opportunities in the post-industrial areas of Wales – such as the Spirit of Llynfi Woodland near Bridgend, which was designed and developed with the local community.

This is what we want to happen:

- Farmers have better support for managing their woodlands and trees to provide ecosystem services and diversify their businesses.
- There is better protection for existing individual trees, particularly veteran trees, and more individual trees are planted in recognition of their contribution to ecosystem services and our quality of life.
- Farmers, rural businesses and communities have the potential to use timber and woodfuel sustainably.
- Tools are developed that will help farmers locate new woodlands and manage existing woodlands to increase overall farm productivity and enhance the landscape.
- Woodland creation and tree planting are promoted as integral elements of land use planning, and an important element of future integrated land management systems.
- Changes to support for land use are used to remove disincentives and instead encourage tree planting, woodland creation and woodland management.

2.6 Urban woodlands and trees deliver a full range of benefits

We want to see woodlands and trees playing a more valued role as components of the green infrastructure in and around Wales' urban areas. Urban trees reduce air and noise pollution and the public health issues associated with them, and outdoor recreation in urban woodlands improves both physical and mental well-being. Urban woodlands can also provide a focus for community action and volunteering, helping to increase social capital, improve community cohesion and reduce antisocial behaviour.

There is a need for a wider appreciation of existing street trees, to help ensure their protection, and for more planting of individual trees in Welsh towns and cities. When associated with buildings, woodlands and trees can soften the junctions between built and natural environments and contribute

to greening urban areas and the restoration of industrial land. We wish to see more creative use of opportunities for planting woodlands and trees in new developments, and in the restoration of brownfield sites. We also want to see better and easier access to urban and rural green space.

Woodlands and trees have a vital role to play in helping people and biodiversity adapt to the effects of a changing climate, which are likely to include changes in the pattern of rainfall, an increased risk of flooding, and higher peak temperatures (particularly noticeable in urban areas). Trees in streets and parks help to cool down urban areas in summer and provide shade for people and buildings. They also help to reduce the pressure on urban drainage systems, by absorbing water that would otherwise run off the large areas of impermeable surfaces.

This is what we want to happen:

- Woodlands and trees are used more creatively in the green infrastructure in and around urban areas (eg new developments, the restoration of industrial sites, active travel routes and green corridors), to provide people with better quality, easily accessible green space.
- Local authorities and others further develop their programmes of urban tree planting and woodland management.
- Continued use of the i-Tree Eco or similar tools to quantify the structure and environmental effects of urban trees, and calculate their value to society.
- Improvement to access to urban woodlands, especially for people who currently do not have easy access to green spaces.
- Local authorities, landscape designers, architects and other relevant stakeholders, ensure that the environmental benefits of trees in modifying microclimate and drainage are taken into account in planning guidance and development control, and when creating sustainable urban drainage systems.
- Promotion of the message that urban woodlands and trees make a positive contribution to many other policy agendas, including those which concern climate change, health, social welfare, lifelong learning and biodiversity, and the management of water and soil resources.



Cooling towers

3. Responding to climate change

Climate change affects the way we all live, and we must address the twin challenges of reducing net greenhouse gas (GHG) emissions and coping with the effects of changing weather patterns. Woodlands and trees in Wales have a role to play in enabling us to achieve various international and domestic climate change targets, for instance the “nationally determined contributions” required under the 2015 Paris Agreement on climate change. *Woodlands for Wales* explains how, through our policies for trees and woodlands, we can respond to these challenges.

A fundamental point is that while the woodlands and trees of Wales have significant potential to contribute directly to our efforts to deal with climate change, this can only be achieved if they themselves can cope with changing weather patterns and new risks from pests and diseases.

Therefore, our first priority is to ensure that woodlands are resilient enough to be capable of withstanding or adapting to the changing climate, because all the resulting benefits depend on having healthy woodland ecosystems. Action is required now to realise change in the medium to long term, because trees have a long life-cycle and changes in woodland management can take many years to implement. We will manage our own woodlands with these aims in mind and encourage and support these approaches elsewhere.

Trees have a significant influence on the microclimate around them, and also affect the movement of water through and across the soil. These beneficial effects on water flows and urban climate will also help the people of Wales cope with the day-to-day effects of climate change.

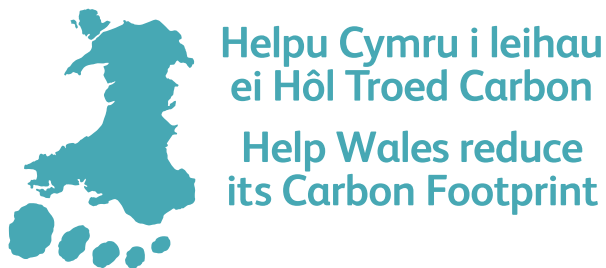
If we can adapt them to be resilient to climate change then existing woodlands and trees, as well as those that might be planted, can all play a part in achieving our targets to reduce net GHG emissions. This contribution is twofold:

- By sequestering carbon during photosynthesis, and locking it up in timber and in woodland soils, trees that are actively growing will remove some of the atmospheric carbon dioxide that humans have created. To have a significant positive impact on our carbon balance we need to see new woodland and trees planted on land that did not have tree cover before.
- We can use timber products harvested from sustainably managed forests as an additional store of carbon absorbed from the atmosphere. This store of carbon is known as the harvested wood products pool. To be effective, we need to ensure that wood is used for as long as possible before it is recycled or disposed of. By using wood products in place of plastic, steel or concrete, we can also avoid the need to use large quantities fossil fuels creating these materials.

Many of the key outcomes for harnessing the benefits of the woodlands and trees to help society adapt to climate change are dealt with elsewhere in this Strategy, but there is an additional, specific outcome relating to reducing net GHG emissions:

- Welsh woodlands contribute to reducing the carbon footprint of Wales.

3.1 Welsh woodlands contribute to reducing the carbon footprint of Wales



Climate change affects the way we all live, and we must continue to address the challenge of reducing carbon emissions while coping with the effects of a changing climate, both now and in the future. Action to address climate change is now a legal commitment in the Environment (Wales) Act 2016. This requires Welsh Government to set decarbonisation targets with advice from the UK Climate Change Committee (UKCCC). Creating new woodland and managing existing woodlands are key parts of the Land Use, Land Use Change and Forestry (LULUCF) component of our emissions reductions goals. We need to plant more woodlands and we need to ensure we are managing our existing woodlands to protect the woodland carbon sink.

The UKCCC has suggested three scenarios for emissions reductions. The main scenario, “Wales 80%” if achieved, would allow Wales to achieve its legal commitment to reduce emissions by 80% from their pre-1990 level before 2050.

This scenario would require significant efforts from the land use sectors. The UKCCC advises that the main decarbonisation option for the land use sector requires planting more trees. They suggest a target for woodland creation which would require an increase from current baseline rates of only a few hundred hectares to around 2,000 hectares each year between 2020 and 2030. This would deliver

0.3MTCO₂e savings in 2030. They propose a “Maximum scenario” which would require the planting of 4,000 hectares a year from 2020 until 2030. The UKCCC advises that once planting programmes in line with these recommendations are under way, they should continue between 2030 and 2050. This advice recognises that emissions from agriculture are expected to become a greater proportion of overall emissions as other sectors decarbonise more rapidly.

The UKCCC also envisages much more integration of trees and shrubs within arable and livestock systems of land use. This would increase soil carbon stocks and reduce nitrogen oxide emissions from fertiliser use, while also contributing to wider sustainable management objectives of improving water quality and soil fertility.

Achieving these goals will require a step change in activity towards woodland creation and increasing the numbers of trees on farms. In its advice on the reduction of agricultural emissions the UKCCC is blunt. For the minimum required emissions reductions it suggests that a move away from the current voluntary approach to emissions reduction in agriculture and that stronger government policy is required.

We know that farmers feel constrained by existing agricultural support mechanisms and by a lack of awareness and skills in managing trees and woodlands. In the context of the agriculture sector making up an increasing share of emissions, as other sectors decarbonise more quickly, there is a need for the agriculture sector to do more.

By managing existing woodland on farms, creating new woodlands wherever possible and integrating new trees and woodland into the farmed landscape, there are opportunities for both agriculture and forestry to contribute to meeting these challenges.

In our existing woodlands, as the trees mature, the overall capacity they have to soak up more carbon will reduce. It is important that the existing carbon sink is maintained when these woodlands are managed – this means keeping the forested area intact wherever possible by replanting harvested woodlands quickly and taking careful account of the impact of increasing unplanted areas or woodlands that have fewer trees growing in them. While there will be some cases where more open areas are needed, in general these new open areas should be balanced by use of closer spacing and higher stand densities elsewhere, or by creating new woodland to compensate for areas lost to achieve redesign and diversification.

The restoration of peatland soils is an important component of land use management for both biodiversity and carbon sequestration reasons. The restoration of open habitats is dealt with more fully in Chapter 6. When woodland removal to restore peatland habitat is undertaken, there should be full consideration of the impact on decarbonisation policies and the net carbon impact should be assessed. Woodland should only be removed on sites which have been assessed as having both a high likelihood of successful restoration, and a well established peatland restoration plan is in place. Consideration should be given to maintaining wet woodland cover in order that above ground biomass can contribute to carbon sequestration.

Peatland soils do not sequester additional carbon even when in good condition – only photosynthesising vegetation does that. However where historic forest drainage is still contributing to peatland erosion and loss of organic carbon from soils this should be addressed as part of routine management.

Research by the Forestry Commission suggests that woodland management aimed at: i) growing enduring timber for construction and manufacturing, ii) using smaller diameter timber for wood fuel and, iii) reducing soil disturbance, are most likely to deliver long term reductions in net GHG emissions. Ongoing research will help us understand how to derive maximum benefit from implementing all the different management options and provide optimum guidance for woodland managers, but the basic principle is well established: bringing more woodlands into sustainable management will make a positive contribution to mitigating climate change.

Responsible burning of woodfuel can make a small but worthwhile contribution to the Welsh targets for reducing GHG emissions. There is an opportunity to replace imported woodfuel with home-grown supplies sourced from new tree planting and increased areas of actively managed woodland. Short Rotation Forestry, practised within a sustainable forest management framework, using the UKFS as a benchmark, could make a useful additional contribution to local woodfuel markets.

As our forests mature and their ability to lock up more CO₂ begins to reduce, there is still potential to increase the amount of carbon stored in harvested wood products. We want to see greater use of wood, particularly in wood products that have a relatively long life such as timber used in buildings or in furnishings. It is important that our woodlands are productive – as set out in Chapter 5. An extra benefit of production of timber is this extra store of carbon. There is also a displacement effect as wood products are used more instead of those based on fossil fuels. As Wales makes the transition towards a circular economy, making less use of plastics for example, paper and wood products have potential as more sustainable substitutes.

This is what we want to happen:

- Significant areas of new woodlands created and more woodlands actively managed at a range of scales and at a rate that is responsive to targets set in the context of the Environment (Wales) Act while balancing the goals of the Well-being of Future Generations Act.
- New and existing woodlands managed in a way which increases their resilience to climate change and balances the achievement of other objectives of this Strategy, producing usable timber and wood products to store carbon over the long term, while also sequestering carbon in biomass and soils.
- Where Short Rotation Forestry is grown with the objective of maximising wood fuel for energy purposes, then this is pursued within a wider sustainable forest management framework that conforms to the UKFS.
- The carbon storage capacity of woodlands is protected by balancing the benefits of woodland re-design, and habitat restoration with the need to maintain carbon sinks in woodland and to increase woodland area where necessary to compensate.
- Changes in woodland cover are monitored on a regular basis to enable smart inventory to apply in LULUCF sector in Wales.



Couple on woodland walk, Gwydyr Forest

4. Woodlands for People

Woodland and trees provide a green backdrop to people's daily lives. They are recognised by 95% of people in Wales as providing benefits for the local community. Evidence from the biennial *Public Opinion of Forestry Omnibus* survey shows that they are appreciated for their biodiversity, active recreation such as walking, cycling, horse riding and for their beauty. So we know that activities within woodlands can contribute towards the improvement of people's health and well-being, support employment and enterprise opportunities and provide places to develop skills and learn in, and about, our natural environment.

The presence of trees in urban areas can improve air quality, mitigate noise, provide shade, enhance active travel routes, improve drainage and provide opportunities for people to connect with nature. Through the survey, people told us that they value streets trees in particular, because they make the area look more attractive, provide places for birds and wildlife to live and remove carbon dioxide from the atmosphere, slowing climate change.

Woodlands provide safe and stimulating environments for outdoor learning and the development of land management and life skills, whilst community involvement in woodland management and use can build social cohesion and support local development. Woodlands support economic objectives through job creation and enterprise development. These jobs and businesses are increasingly diverse and range from land management services, manufacture of woodland products, leisure and tourism enterprises and health services.

The realisation of these benefits is best achieved when people live in the presence of trees, are able to visit woodlands frequently; are involved in design of accessible green space; are active in woodlands; can obtain local woodland products; can create woodland-based livelihoods and communities and are

involved in the management of woodlands. We need to deal with the inequality in the flow of benefits from woodland and trees. There are woodlands which nearby communities cannot get access to. There are urban areas without trees, rural communities without access to communal green space and unemployment in areas with potential for innovative woodland enterprises.

There are four key outcomes where woodlands and trees contribute to the improvement of people's well-being:

- More communities are involved with, and benefit from their local woodlands and trees.
- More people, of all ages, benefit from education and learning opportunities provided in, and by, woodlands and trees.
- More people live healthier lives as a result of using, enjoying, and living in proximity to, woodlands and trees.
- More people benefit from woodland-related enterprises and associated employment opportunities.

4.1 More communities are involved with, and benefit from their local woodlands and trees

Provision of public benefits is a central tenet for the WGWE and other public woodland in Wales. NRW and other public bodies are required to involve people from as early a stage as possible and should seek to collaborate with third sector bodies and communities to achieve goals which have been decided together. In practice this means local communities should be consulted and invited to contribute to the preparation of management plans for their local WG woodland. Greater community involvement in woodland, such as management agreements and leases to social enterprises, have been shown to deliver additional public and well-being benefits and should be used to encourage collaboration between WG and local communities.

For the private sector, the forestry standards (UKFS and UKWAS) require that local people with an interest in the woodland are identified and made aware of management plan preparation for a woodland. Consultation with local people and stakeholders is not expected to be as wide ranging or open-ended as for the WGWE but engagement should be sufficient to identify permissive or traditional uses of the woodland and significant social impacts so they can be accommodated in the management plan.

Consultation on woodland management plans takes place periodically and is quite low level – only 5% of survey respondents recalled having been consulted on a local woodland management plan. However, 39% of respondents said they would like to be consulted. This suggests that the public is interested in their local woodland and that this desire for involvement could be harnessed to achieve sustainable management. Greater emphasis should be given to encouraging meaningful dialogue between local communities and woodland owners to at least maintain or potentially increase the flow of benefits from all woodlands. The benefits under consideration should include access to woodland and woodland products as a basis for enterprise development.

The greatest level of involvement occurs when a community comes together to take on the management responsibility for a woodland. There has been significant growth in community ownership, lease and management agreements with both public and private woodland owners. The *Public Opinion Survey* identified the most common disadvantage of woodland are incidents of fly tipping, that ‘woodlands near us provide a place for criminal activity’ and ‘we can’t control what happens in our local woodlands’. In those cases where communities have taken greater control of woodlands there has been a reduction in anti-social behaviour together with increased community benefits such as volunteer opportunities (eg litter picks) and social cohesion. Some woodland groups evolve into social enterprises and deliver woodland-based learning, training, health and well-being services, firewood, craft products and jobs.

Realisation of the full benefits of community involvement in woodland requires commitment on the part of the woodland owner and local people and both require support to understand their roles in creating woodlands for people.

This is what we want to happen:

- Communities are more involved in the decision making and management of woodlands and trees so that they deliver well-being benefits to more people.
- NRW and other public sector managers of woodlands and trees fully involve local communities in woodland planning and collaborate where feasible and appropriate.
- Advice and support is provided for private woodland owners so they can undertake

community consultation and include provision of public benefits in woodland management plans.

- Community groups, NRW and local authorities and private landowners are able to develop legal agreements, access funding and the support required to increase the variety, longevity and depth of community management agreements, woodland enterprise opportunities and to support community ownership of woodlands.

4.2 More people benefit from education and learning opportunities provided in, and by, woodlands and trees

Woodlands and trees are being used in Wales by the public, private and voluntary sector to support a wide range of learning initiatives. These include outdoor learning to deliver the school curriculum and connect children and young people to nature, citizen science project and field studies, work-relevant woodland skills training and accreditation, hobby activities such as basket weaving, recreational learning such as bushcraft and photography courses, and learning through play.

An outdoor setting, particularly woodland, has been shown to support both conventional and informal learning by providing a stimulating environment where children and adults can learn. Woodlands offer a rich resource for a wide range of subjects, and provide an ideal setting to learn life skills, such as team working and communication. Woodland management and the use of wood to make products also requires a wide range of technical skills. Woodlands can be managed to provide a very

adaptable environment to support the learning needs of very different groups, from children with learning difficulties through to adults and older people.

Learning in woodlands also provides an ideal setting to introduce concepts such as ecological resilience, sustainable management of natural resources, and global responsibility. These topics are becoming increasingly important as society adapts to climate change and have been identified as a core purpose within the revised curriculum for Wales. Learning outdoors also has major physical and mental health benefits, especially for children, and initiatives to support regular informal play in woodlands complement more structured learning.

Despite the increase in woodland learning few school pupils are made aware of forestry as a profession and those entering the sector find out about it through other sources. There is a need to highlight woodland-based employment opportunities in schools, colleges and other support provided for people seeking employment.

This is what we want to happen:

- More people of all ages and backgrounds benefit from accessible woodland and trees as settings for education, learning and play, leading to an improved understanding of woodlands and trees and the wider benefits they provide in terms of our environmental, economic, social and cultural well-being, and more sustainable and responsible behaviours.
- The public forest estate in Wales provides safe, accessible and well-managed woodlands as a setting for learning for all ages and abilities and encourage similar provision by private woodland owners. There is special emphasis given to provision in areas where educational attainment is lowest.
- The development and delivery of quality assured woodland and tree related educational and learning resources which are available to and used by teachers and other educators.
- There is a culture of responsibility to future generations and ethical, informed citizenship through the appreciation and understanding of the woodland environment in all learning and training in, and about, woodlands.
- People are able to take part in woodland-related recreational learning (eg hobby crafts) and opportunities for learning through play.

4.3 More people live healthier lives as a result of using, enjoying, and living in proximity to, woodlands and trees

Woodlands and trees make a significant contribution to the physical, mental and emotional well-being of all people in Wales, and can make a particularly valuable contribution to tackling health inequalities and supporting preventative and therapeutic strategies for well-being that are sustainable into the long-term.

It is now widely acknowledged that there is more to health than simply the absence of illness, and that health and well-being are intrinsically linked to the physical, social and economic context of people's lives as well as their genetic make-up or lifestyle choices. The evidence suggests that the environment and how land is used has a significant impact on physical and mental health, and far-reaching effects on how individuals live their lives and gain access to public services, employment, local fresh food and open green spaces – all of which are imperative for healthy lifestyles. Woodlands and trees generate important health benefits through the ecosystem services they provide and through encouraging physical activity, mental restoration and social interaction. This means that well planned and managed trees and woodlands, at a landscape, local and individual tree scale, have a significant role to play in protecting and improving people's health and well-being.

By mitigating heat, flood risk, and noise, and improving air and water quality; trees and woodlands will be increasingly important in managing the health impacts associated with climate change, particularly in the built environment. As well as protecting people's health, these kinds of impacts can also improve it – for instance, reducing flood risk improves people's mental well-being.

At the same time woodlands and trees offer opportunities for active recreation, tranquillity, visual appreciation, and environmental volunteering, all of which have a wide range of benefits for well-being. Outdoor recreation is recognised as increasing the frequency, duration and intensity of physical activity. The benefits of increasing fitness can help address many of the most critical health issues we face in Wales, as it has been shown to lower rates of obesity, cardiovascular disease, osteoporosis and type-2 diabetes, as well as some cancers. Well-managed, welcoming woodlands provide an ideal setting for outdoor exercise, enabling people to connect with nature and develop lifelong patterns of healthy living which will support their well-being long term and prevent avoidable health problems from arising in future.

Spending time in a natural woodland environment can also be helpful for those with mental health problems, modify anti-social behaviour in young children and adolescents, improve concentration in schools and workplaces, and support people coping with stress and depression. The health and therapeutic benefits of woodlands and trees are well-recognised by the NHS in practices such as 'green prescribing', nature-based interventions and through the NHS Forest initiative.

Maximising the health benefits of woodlands and trees will require not just increasing their scale but also ensuring that people – particularly those who have the greatest health needs – have good access to them.

This is what we want to happen:

- More people lead healthier lives and enjoy greater well-being because they are able to take advantage of opportunities to use and enjoy woodlands and trees close to where they live.
- More well-managed woodland across Wales delivers these benefits for all.
- All people, and particularly those with most need or least current access to woodland, have the opportunity to access to woodland, whether it is publicly or privately owned.
- Public bodies and public service boards actively pursue and plan for the use of woodland to support long-term, equitable well-being for all.

4.4 More people benefit from woodland-related enterprises and associated employment opportunities

Woodlands and trees provide many resources for human use such as timber for building, firewood and charcoal, wild animals and plants used as food or for crafts; while forest streams can provide water for power generation and the woodland itself can provide a setting for delivery of commercial services. As such woodlands provide numerous opportunities for individuals, SMEs and social enterprises to start up and operate businesses, develop work-skills, create local jobs and livelihoods and increase economic activity.

Employment opportunities start with woodland management and in Wales we have many examples of a wide range of land-based contracting businesses. Some of these are specialist forestry contractors while others offer more general services such as fencing or track maintenance. There is a distinct structure to this sub-sector with a mix of large-scale contractors with a high degree of mechanisation and small-scale contractors using more motor-manual or traditional (eg horse logging) methods. This range in scale and methods is needed to accommodate the wide diversity of woodland size, condition, access and owners' objectives.

Well managed woodlands provide a flow of raw materials from wood fibre to fruits and flowers which can be harvested and sold in bulk. However, employment opportunities are enhanced by processing industries in Wales. The scale of woodland product value addition is adaptable and can provide important opportunities for local employment as well as potential for increasing downstream economic gain to communities from larger scale business and enterprise. The current structure of timber markets often means that communities are unable

to purchase timber or firewood from their local woodlands. Where there are competent local timber businesses, socially-orientated opportunities for small scale standing sales could provide additional community benefits including employment, greater connection between people and their local woodland and contribute towards an efficient circular economy. This is particularly important in rural and deprived areas where employment opportunities are scarce.

The provision of woodland based facilities and services related to tourism are significant enterprise and employment opportunities. Specialist recreation facilities in woodlands can attract visitors who then support other local businesses, including restaurants and accommodation providers. For example, Wales can boast some of the best mountain bike routes in the world in its woodlands, and strong links with organisations like Visit Wales ensure that the routes themselves are well promoted and that local businesses can make the most of the opportunities they bring to the local economy. Woodlands also provide ideal settings for other activities such as game bird shoots, bushcraft courses and mushroom foraging holidays which enhance the woodland tourism offer. Hosting national and international sporting events such as the Wales Rally GB can also bring in significant numbers of visitors and income to the Welsh economy.

Woodland products also support a variety of social businesses and enterprises. Social businesses are enterprise opportunities around, for example the provision of green prescriptions (eg leaders for walks prescribed for heart conditions) or Forest School leaders (offering learning programmes and skill development). Social enterprises encompass a broader range of income-generating activity (including timber sales) where the profits are reinvested back into the social or environmental objectives of the enterprise.

This is what we want to happen:

- More people derive employment and livelihoods from enterprises associated with well-managed woodlands and trees.
- The supply of woodland products such as high-quality construction materials, non-timber forest products and firewood to meets the needs of nearby communities and support rural and local enterprises.
- There is innovation and new woodland-based businesses and social enterprises are able to start-up.
- The development and maintenance of tourism and sports infrastructure in woodlands, supports Wales tourism goals, particularly where this provides downstream economic benefit to communities.
- The sustainable development of woodland based livelihoods is supported through Planning Guidance and Regulations and in local Well-being Plans.



Extracting oak thinnings

5. A competitive and sustainable forest sector

The Welsh market for timber products is dominated by imports, which means that both timber growers and manufacturers operate in a fiercely competitive environment. The forest sector in Wales now contributes an estimated £528.6m to the national economy and directly employs between 8500 and 11,300 people. We recognise the vital role of Welsh timber in financing woodland management and in supporting the growth of Welsh forest industries, especially in rural areas. We also value the role of timber as a key renewable resource

to support our sustainable development, environmental and decarbonisation policies.

There is also a direct financial benefit from the tourism sector that is attributed to Welsh forests and an indirect financial contribution to non-market benefits like climate change. The *Valuation of Welsh Forest Resources* report gives an indication of the values of these non-market benefits provided by Welsh forests which adds to our knowledge of what the sector provides.

Table 2: Annual value of service flows from forests in Wales 2015

| Service | Timber extraction | Carbon sequestration | Recreation | Air quality | Total |
|------------------------------|-------------------|----------------------|------------|-------------|-------|
| Value, £ million 2015 prices | 28.3 | 108 | 85 | 385 | 606.3 |

Source: Valuation of Welsh Forest Resources, Forest Research October 2017

In Wales, most sawmills rely heavily on coniferous timber as their raw material. Over 60% of Welsh sawlogs are processed in sawmills in Wales and there is clear potential to increase the value of timber produced in Wales through secondary processing.

The Welsh forestry sector, including management, harvesting and processing, includes many family owned businesses with a predominantly rural base. These provide valuable employment opportunities for local communities. Some of these enterprises are also involved in the management of predominantly smaller and more diverse native woodlands.

The sector produces a range of timber products including panel boards, sawn timber used for construction, packaging, flooring and fencing, wood energy products including pellets, chips, brash bales and firewood for industrial, commercial and domestic use as well as niche products such as charcoal, furniture and craft products.

There are large areas of currently unmanaged broadleaf and farm woodland in Wales. Although not all of this woodland is suitable for market-orientated management, collectively it represents a major opportunity to increase production of usable timber in response to increasing demand, predominantly for energy, and thereby support the development of smaller

businesses. We wish to see a resurgence of sustainable economic activity in these Welsh woodlands, to deliver a range of outcomes of this strategy and support the sustainable management of natural resources.

The need to diversify the species mix and management of the WGWE and the aspiration to do the same across the wider forest resource including privately owned woodlands, presents real challenges for the processing sector in Wales over the next 20 to 30 years. The major wood processing companies, including sawmills, have invested heavily to build the capacity to process and add value to the timber produced from the current Welsh woodland resource – most notably the conifer crops first established as a strategic reserve of timber in the post-war era. That confidence was based in part on reliable information on the quantity and nature of future timber production, and also on confidence in the supply chain. Realising the potential of a more diverse Welsh woodland resource in the future will require further investment in processing capacity, and good information on future timber production.

For all these reasons we have adopted the strategic objective of maintaining national woodland productive potential at current levels and would expect it to increase gradually with new woodland creation. We intend to achieve this by increasing woodland cover in Wales, supporting the sustainable management of currently under-managed woodland, whilst maintaining output from our own woodlands in the short to medium term. These changes and opportunities pose many challenges for both timber growers and processors, as well as government. Support in making changes is likely to need both ‘pull’ from market development and ‘push’ from regulation and incentives; advice and knowledge transfer; co-operation with other land-based

sectors; land-use change; the provision of information and business support; as well as a robust supply chain.

Continued investment and innovation in mechanisation and in IT equipment, underpinned by good financial returns, have led to high levels of investments in the forest sector in Wales and an increase in skills both within the land-based and the processing parts of the sector. There has been an increased recognition of the benefit of continuing professional development through the aspiration to gain Chartered status for foresters and arboriculturalists and a clear career path throughout the forest sector, however the challenge of attracting new entrants to a rewarding but challenging industry remains.

Given this changing context we have identified four key outcomes for the Welsh forest sector:

- More timber is grown, processed and used in Wales.
- The forest sector remains competitive and sustainable, supporting the Welsh economy.
- Increased use of timber as a key renewable resource.
- A thriving, skilled workforce in the forestry sector that can adapt to change.

5.1 More timber is grown, processed and used in Wales

Adding value to the timber currently available is just as important as increasing overall output. Wales already has a track record of investment and innovation in developing new uses for wood and acting as an early adopter for new technologies developed elsewhere and this work should be encouraged.

The UK, including Wales, is a major importer of wood and wood products globally. There is significant potential to increase our utilisation of home grown timber and develop our capacity to produce higher quality timber

products which would add value to the whole supply chain, from harvesting to secondary processors. This value-added approach would help to develop and further integrate local supply chains, making the Welsh economy more resilient at time when global demand for timber, and therefore the cost of importing products, is likely to increase.

We intend to provide more accurate information on the utilisable timber becoming available from Welsh woodlands to allow current businesses to adapt and new businesses to develop to respond to long-term changes.

This is what we want to happen:

- The productive potential from Welsh forests is protected in the short term and rises in the future to enable the whole sector to grow and expand.
- The forest sector is helped to seize the opportunities and overcome the challenges of the changes needed to implement this strategy working collaboratively across the sector.
- When diversifying woodlands, owners choose species with timber properties that future markets are likely to utilise (eg for construction, fuel, fencing or packaging).
- Investment in long-term woodland management and new woodland creation is encouraged and supported, including adaptation and innovation to meet new opportunities.
- Research and development work supports innovation, development and knowledge transfer on: harvesting, handling, processing and product development.
- Advice is provided to growers on the timber properties and suitability of different species.
- The sector will be supported to stimulate demand for woodland products from Wales.
- Accurate information is provided on the impact on future timber supplies of the long-term changes to Welsh woodlands.

5.2 The forest sector remains competitive and sustainable, supporting the Welsh economy

A thriving forest industry is important to the Welsh economy. There is good demand for timber products and this is likely to increase with the focus on sustainability and awareness of the carbon footprint of materials. These drivers will lead to a greater demand for wood products that have a lower carbon footprint than many other materials and are sustainably produced.

Welsh wood-based industries are competitive and sustainable and will need to continue to adapt and invest to ensure that they remain able to compete with the best in the world. It is essential that the demand and market for higher value products and services

continues to grow and that the whole forest sector can respond to this opportunity.

We wish to encourage a wood-based culture in Wales and the UK so that wood as a sustainable material becomes a first choice for customers and the industry continues to innovate and respond to customers' needs.

We intend to continue to work with other UK administrations to lead and support research and development and promote knowledge transfer throughout the forest sector to enable businesses and owners to make informed decisions. This will help to encourage the development of new products and processes which will make the industry in Wales more competitive and will promote opportunities for collaborative research and development within the wood sector.

This is what we want to happen:

- Existing and emerging enterprises flourish at many different scales, using home-grown timber and contributing to the Welsh economy.
- The whole supply chain is much better integrated, involving owners and growers, managers and contractors, primary, secondary, tertiary processors and the end user, with the private sector providing leadership and direction.
- The private sector engages with and informs the debate about choice of tree species to diversify woodlands.
- Economic development support is available for all scales of industry-led initiatives to access to maintain a resilient sector, to develop capacity and build more resilient supply chains.
- Co-operative initiatives across the whole sector continue.

5.3 Increased use of timber as a key renewable resource

Timber is a key renewable resource because its ability to store carbon contributes directly to reducing the carbon footprint of Wales and the ambition set out in the Environment (Wales) Act 2016 that by 2050 net emissions are at least 80% lower than the baseline set in legislation. Demand for certified timber products is increasing, and growing consumer awareness of environmental issues, public policy on climate change and regulations to reduce the carbon footprint of buildings all create favourable conditions for marketing locally-grown wood, both as a sustainable building material and for low-carbon fuel. Wood is a finite resource within Wales and we must ensure that it is used intelligently to meet these demands – our priorities are adding value to Welsh-grown timber and locking up carbon in long-term uses. We also

wish to see strategies for reducing the carbon footprint of Wales taking full account of the sustainable life cycle benefits and well-being benefits of reusing, recycling and burning wood. There are likely to be opportunities for wood and wood-based products to substitute for non-renewable and polluting consumer products such as plastics as packaging.

A key challenge for the sector in Wales is a market dominated by imported timber, now and in the future. The properties of Welsh timber are such that the sector must continue to make the best use of what it has by innovation and product development through timber modification and other creative techniques. Both public and private sector end users have an important role to play, in choice of materials for building, manufacturing and fuel supplies, and in their procurement policies.

This is what we want to happen:

- There is more ‘pull’ for wood and timber products from Wales, as sustainable, renewable building and construction material.
- Local procurement of timber and the capacity to process timber increases in Wales the use of wood grown and processed in Wales is maximised to ensure the most benefit from a finite resource.
- The principles of the use, reuse, recycle approach are applied to the use of wood.
- The public sector will take a lead with timber and wood product procurement policies that reflect the sustainability of the whole supply chain.
- Policy makers, planners, architects, the building sector and others work collaboratively to stimulate this market ‘pull’.

5.4 A thriving, skilled workforce in the forest and woodland sector that can adapt to change

The forestry sector encompasses a wide range of employment opportunities particularly in rural areas, from low skilled manual work through to senior management positions. These roles require a range of practical, technical and management skills as well as agents with well-developed business skills. It also needs the capability to deliver the multiple benefits well managed woodlands have to offer for Welsh economy, the environment and the people of Wales.

Expanding the woodlands and forestry sector is an opportunity to provide many high skilled and well paid rural jobs, however the sector still faces a challenge in being an attractive career proposition for school leavers and others. The *Forestry Sector Skills Study 2017* undertaken in England and Wales indicated that few school pupils are aware of forestry and arboriculture as a profession, generally those entering the forest sector find out about it through other sources.

The *Forestry Sector Skills Study* also found that more needs to be done to encourage new entrants at all levels within the supply chain and to provide them with training opportunities to achieve recognised qualifications. It was identified that there are training and development needs at all levels of the forest sector and particularly for new entrants. These training needs require investment and support throughout the forest sector and should be supported through continuing professional development.

It is also important to make the link between life-long learning in woodlands and what they contribute to well-being in Wales. If children use, enjoy and understand woodlands as part of their education, as they grow up they are more likely to understand the purpose and value of woodland and appreciate the wide range of benefits it provides. Although only a small proportion will go on to work within the sector a more informed population will help to promote the sustainable management of natural resources and support the use of renewable woodland products in Welsh society.

This is what we want to happen:

- People recognise that a job in the forest sector makes a valuable contribution to the sustainable management of natural resources and well-being benefits in Wales.
- More people with the right skills enter all levels of the supply chain and there are opportunities for new entrants to the forestry sector, including through apprenticeships to address skills shortages.
- There are more robust and reliable career paths and support for professional qualifications.
- More opportunities are created for local people to be involved with woodlands.
- There will be more opportunities for robust career paths through the sector including skills training and continuing professional development in the forest sector.



Wetland area, Pembrey Forest Nature Reserver near Llanelli

6. Environmental quality

Welsh woodlands and trees are vital to the delivery of the priorities as set out in our Natural Resources Policy for Wales. They are an important element within Wales's rural and urban landscape character, culture and heritage. Irreplaceable ancient woodlands and trees, wood pasture and other species-rich habitats have a vital role in providing a range of ecosystem services. The quality of woodland habitats is determined by the condition and function of woodland soils, water, biodiversity, and heritage, and contributes to our landscape.

Biological diversity underpins the structure and functioning of our ecosystems and has wider economic, social and cultural significance. Improving the diversity, connectivity, extent and condition of our woodlands through appropriate management and woodland creation is key to healthy and resilient woodland ecosystems.

We have identified five key outcomes to safeguard and improve the environmental quality of woodlands and trees in Wales, and to extend the range of ecosystem services they provide:

- Woodland management achieves high standards of environmental stewardship.
- Woodlands and trees of special conservation value are identified, protected and in favourable management.
- Woodland biodiversity is supported and native woodland is in favourable management.
- Woodlands and trees make a positive contribution to the special landscape character of Wales, to sites of heritage and cultural importance and the urban landscape.
- Woodlands and trees contribute to water and soil management.

6.1 Woodland management achieves high standards of environmental stewardship

Improved environmental stewardship lies at the heart of this strategy. It is the key to healthy and resilient woodland ecosystems and will be critical to the ability of woodlands to deliver the range of ecosystem services we need from them over the next 50 years. The quality and consequences of every site-management decision will have an impact on the woodland ecosystem and affect its ability to deliver the long-term environmental improvements that we seek.

The *State of Natural Resources Report* (SoNaRR) indicated that the apparent trend in sustainable management of woodland is increasing, with 203,000ha of Welsh woodland known to be managed to the UKFS in 2014. However around 40% remains unmanaged, reducing their resilience and ability to deliver ecosystem services. Individual woodland management actions require better and more effective application of the UKFS and its associated suite of guidelines to ensure sustainable forest management. It is important that we have assurance that the right standards are being implemented. So we support greater use of the auditable UKWAS as a means to enable us to be provided with that assurance.

Climate change brings challenges of extreme weather events and pests and diseases, which can affect the range and resilience of individual tree species. This in turn has implications for the make-up of woodland types and habitats, the biodiversity they can support, and the provision of wider benefits such as landscape character and commercial production.

There are several invasive native and non-native woodland species that seriously affect the ability of woodland owners to deliver many of the outcomes set for this strategy, including that of improved woodland diversity. In some cases, these have contributed to the risk of disease introduction and spread. None of the impacts of species such as grey squirrel, deer and rhododendron, can be considered in isolation from other policies or the wider interests of society. For this reason we continue to deal with these issues in a strategic and targeted manner. We will continue to encourage other parts of government, as well as our delivery partners and stakeholders, to work closely together to develop and deliver countryside approaches to achieve agreed priorities.

Wildlife crime is an issue in some woodland, where rare species can be threatened by plant and egg collectors. Unpermitted activity

such as hedgerow removal, tree felling without a licence and other environmental nuisances such as fly-tipping, off-road vehicle access and illegal fires also put pressure on woodland ecosystems.

Woodland, particularly ancient woodland, supports more threatened and vulnerable species than any other habitat. Trees and woodland are also of particular significance to pollinators, being a widespread source of pollen and nectar. Woodland management work can sometimes pose a threat to protected species, such as hazel dormouse and bats. Equally a lack of management can affect the condition of the habitats that these species occupy. It is important that people understand how best practice woodland management can help protect wildlife, woodland users and habitats.

This is what we want to happen:

- All woodlands and trees are managed sustainably to high standards of environmental stewardship, safeguarding and enhancing the full range of ecosystem services through more widespread and effective application of the UKFS and greater uptake of auditable standards such as UKWAS.
- Woodland managers use the most appropriate management techniques to achieve site-specific objectives, which contribute to more strategic landscape scale objectives delivering a variety of ecosystem services.
- The impacts of climate change, particularly extreme weather events, pests and diseases, are communicated, planned for and managed so that woodland resilience increases.
- Invasive native and non-native species are managed through a strategic and targeted approach at a landscape scale through partnership working and collaboration.
- Woodland managers, owners and enforcement authorities co-operate to minimise environmental nuisances, wildlife crime and illegal activities.
- There is a woodland management culture of sharing successes, communicating information on new and increased threats to delivery, and learning from problems, which leads to higher standards of environmental stewardship.

6.2 Woodlands and trees of special conservation value are identified, protected and in favourable management

Wales' Natural Resources Policy sets out a commitment to carefully manage trees and woodland that have high environmental values, including ancient woodland sites, ancient, veteran and heritage trees, which are an irreplaceable resource that provide a wide range of ecosystem services.

Only around 5% of woodlands in Wales have designated conservation status. Of these, around 39% are Special Areas of Conservation woodland, with latest figures showing that around 30% of these woodlands are in 'favourable condition'. Woodland processes work over very long time-scales, which means that favourable condition status may not be achieved for some time, even if appropriate management is in place and condition improving. Natural Resources Wales manages the database of the site actions required to achieve favourable condition on behalf of the Wales Biodiversity Partnership.

Most of the ancient semi-natural woodland and other native woodland in Wales are not publicly owned. We know that much of this valuable resource is fragmented and isolated, and makes up much of the 40% unmanaged woodland in Wales. The LIFE Natura 2000 programme showed that a lack of, or poor woodland, management was the main pressure impacting on the condition of these sites.

The removal of ancient woodland and trees continues through direct destruction by development or from neglect of individual trees, and is a significant contributor to on-going biodiversity decline. Post war, many ancient woodlands were cleared and replanted with fast growing non-native conifers to provide strategic timber resources for the future. Nearly a third of Ancient

Woodland Sites in Wales are comprised of these Plantations on Ancient Woodland Sites (PAWS). However many sites have retained features of ecological and cultural interest, and with sensitive and appropriate management, can be restored to native woodland. Progress is being made in restoring some of these PAWS to a more natural state, with targets of over 5000ha set for the WGWE alone.

An updated *Inventory of Ancient Woodland Sites in Wales* was launched in 2011. Making use of this we aim to gradually restore all PAWS under our ownership to a more natural state, with ongoing management to improve their ecological condition. The exception will be those PAWS that, on assessment are shown to have insufficient ancient woodland remnants to enable successful restoration. When restoration is not possible, based on consideration of the remnant evidence, then a change of woodland character may still be appropriate for wider landscape, ecological or cultural reasons. We shall follow best practice restoration guidance and the restoration programme will be prioritised by these wider considerations of ecological restoration potential, sites most at risk and other factors such as cultural importance.

We still want these restored PAWS to be productive, as well as providing the full range of environmental and social benefits that restored ancient woodlands can offer. This means continued management for timber production, so we envisage a gradual and continual transformation to a more natural state, creating a mixed-species woodland with a range of stand structures. For this reason we intend to accept managed regeneration of non-native species if this poses no threat to the overall habitat restoration objective and is a useful addition to production potential – in such cases it will be entirely consistent with our restoration policy. We recognise that other woodland owners

may have different objectives for their PAWS, but we shall continue to encourage the adoption of similar practices.

There is concern that over time, further progress on restoration will reduce Welsh timber production, as a number of these sites are highly suitable for growing quality non-native species. A recent report by the

Woodland Trust suggests that the extent of the impact in Wales of restoration of PAWS on long term softwood availability will be small. However we recognise this concern, and we aim to help deal with it through our twin strategies of bringing more woodlands into sustainable management and increasing overall woodland cover in Wales.

This is what we want to happen:

- Woodland sites of international, national and local importance are brought into favourable ecological management, and are able to adapt to climate change.
- We have more information about wood pasture, parkland and ancient and veteran trees in Wales, so that we can improve mapping and monitoring of their extent and condition.
- In our parks, gardens, towns and countryside, all woodland, individual trees, and particularly ancient woodland and veteran trees, are valued and better managed for their biodiversity, landscape, heritage and cultural value, so they are safeguarded for the future.
- Protection mechanisms for important trees and woodland is strengthened and embedded into land use policies.
- All PAWS on our own Woodland Estate are prioritised for restoration, after considering the remnant evidence and wider ecological, landscape and cultural factors; and are gradually restored to a more natural state with ongoing management to improve their ecological condition and, where appropriate, to produce timber.
- Other woodland owners are encouraged to manage their ancient woodland and to restore their PAWS.

6.3 Woodland biodiversity is supported and native woodland is in favourable management

All woodlands, including 20th century coniferous planted woodland, provide habitat for a wide range of flora and fauna but some woodland types are more significant than others from a biodiversity perspective. Semi-natural broadleaved woodlands comprise six of the interim list of habitats of principal importance in Wales and support 39% of species of principal importance. They also include seven habitats listed under the EU Habitats Directive. SoNaRR (2016) indicated that their overall conservation status was unfavourable, but that there was a trend of increasing favourable management where local agreements and projects were in place. We only know the status of individual species for a limited number of higher profile species but the provision of good quality habitat is fundamental to the viability of woodland biodiversity. Appropriate management is needed to improve the condition and resilience of these woodlands to increase and secure the diverse range of species they support. Programmes such as the Welsh Government's Environment and Rural Affairs Monitoring and Modelling Programme will improve the evidence base.

Wales needs both large and small diverse woodlands that include conifer and broadleaved species, as well as hedgerows and hedgerow trees. We intend to target

an expansion of native woodland, based primarily on the ecological potential of individual woodland sites and the principles of inter-connectivity of semi-natural habitats. In addition to the restoration of ancient woodland sites, many types of woodland could be converted to a more natural state, bringing great benefits for biodiversity while continuing to yield marketable timber products. We must be careful to ensure that appropriate species are used and sourced responsibly to avoid the introduction of pests and diseases.

It is important to protect the structure and functioning of woodland habitat networks and, where necessary, to reverse the fragmentation of semi-natural habitats. By improving woodland networks through new woodland and hedgerow creation, we will make it easier for wildlife populations to reach new habitats and to move in response to a changing climate. We recognise that ecological network approaches can open up opportunities for the dispersal not just of desirable species but also of pathogens and problem species such as the grey squirrel. Improving woodland networks will require a strategic approach that is integrated with other land uses and sensitive to local needs.

The Nature Recovery Action Plan (NRAP) for Wales, in support of the international Aichi targets, sets out commitments to take action on biodiversity which are reflected in the outcomes below.

This is what we want to happen:

- There is better support for decision making and management to improve the condition of priority native woodland habitats, and of woodlands that support priority species.
- Our public forest estate is managed in line with UKWAS to improve the ecological condition of priority native woodland habitats on our estate for the benefit of woodland species (including those which rely on non-native woodland) and other woodland managers are encouraged to do the same.
- Non-ancient woodland on our own estate is converted to a more natural state in line with UKWAS using best practice guidance and other woodland managers encouraged to do the same.
- Where there is a clear ecosystem service benefit, continue to restore priority open habitats such as deep peat on our Woodland Estate, in line with appropriate guidance; other woodland managers are encouraged to do the same. Loss in woodland cover to be compensated through new woodland creation elsewhere.
- The woodland network is strengthened in key areas of Wales, by improved management of existing woodland, creation of new woodland and hedgerows, targeted conservation efforts or by making the intervening spaces more friendly to woodland species (without harming priority species that rely on open habitats).
- Land use policy encourages private woodland managers to undertake actions to strengthen the woodland network, taking evidence for landscape scale interventions into account and reflecting local needs and impacts.

6.4 Woodlands and trees make a positive contribution to the special landscape character of Wales, to sites of heritage and cultural importance and the urban landscape

Many of Wales' most cherished landscapes depend on constituent woodlands, wood pasture, trees and hedgerows for their distinctive character, and need the protection offered by appropriate management. In addition there is a significant opportunity to create more special landscapes in Wales, through the appropriate creation and management of more woodlands and hedgerows.

Ancient and veteran trees are a cultural resource linking people to place, environment and culture (past and present), and also provide continuity of habitat for some increasingly rare lichens, mosses and fungi in both the rural and urban landscape. Sometimes described as green monuments, veteran trees are too often perceived as a problem rather than an asset, and not properly cared for. More information on their location and status can help us ensure these trees are protected and effectively managed.

Hedgerow trees can often be overlooked, poorly managed and at risk of damage by livestock, yet they are distinctive features in the landscape and provide breeding sites, food and shelter for many species. We have some rare native trees in Wales, for example round-leaved whitebeam and Doward

whitebeam and also some magnificent non-native specimen trees in parks and gardens.

Woodlands and wooded parklands can themselves be historical or archaeological features which contribute to the character of the landscape. Although in many cases woodland cover protects the archaeological integrity of heritage sites there are instances where tree roots may be causing damage, and such sites may need special care. The long history of settlement in Wales has left its mark, and there are some historic landscapes where new woodland would not be appropriate.

Urban tree canopy cover in Wales was 16.9% in 2009 – mid range in world rankings. The lowest tree cover is found in high density housing areas, often in deprived areas. Trees contribute to health and well-being, improve air quality and counteract extremes of climate change through the provision of shade, shelter and green infrastructure. Their contribution to a more attractive environment also brings economic and social benefits through inward investment, property prices and lowering crime. This has been recognised through the availability of support to improve and enhance green infrastructure at a landscape, local and small scale, at both the urban and wider environment. However urban trees are under pressure from development and lack of forward planning for their replacement.

This is what we want to happen:

- Woodlands, trees and hedgerows make a positive contribution to the special landscape character of Wales, its historic environment and cultural heritage.
- Current and historic wooded landscapes are protected, whilst evolving to take account of changing cultural values and preferences and their influence on working landscape.
- Individual trees, ancient and veteran trees, wood pasture and woodlands in our urban areas and countryside, are better understood, protected and managed for their cultural significance, aesthetic quality and heritage value.
- The value of archaeology within the woodland is respected, as well as the archaeology of the woodland; in creating new woodland, existing heritage sites are protected from damage and the integrity of historic landscapes is preserved.
- Visitors can experience the cultural history of woodlands and their historic features, in particular Ancient Woodland Sites.
- More use is made of Welsh wood products in the restoration of historic buildings.

6.5 Woodlands and trees contribute to water and soil management

In the right place, woodlands can be an effective way of tackling environmental problems such as diffuse pollution, poor water quality and soil erosion. They can also hold back water run-off, reducing flood risk and maintaining flows during dry weather. To get the best results for water and soil management, new woodlands and trees will need to be planted in appropriate locations and existing woodlands may need to be managed differently in the future.

Tree roots make it easier for soils to soak up rainfall, so less water runs off into drains and rivers – this can be useful in the upper parts of river systems where rainfall is higher. Hedgerows, while important for connectivity and biodiversity, also have a role in water management through interception. Further downstream, when heavy rainfall causes river levels to rise, the risk of flooding can be reduced if the flow is slowed down, and woodlands can be a cost-effective way of doing this. Fallen logs and branches can form woody dams and pools that help enrich freshwater habitats and slow down flood flows.

Carefully planned and managed woodland created alongside watercourses can reduce the risk of soil erosion, pollution and nutrient run-off from neighbouring fields. In urban areas trees can contribute green infrastructure, such as Sustainable Urban Drainage Solutions (SUDS) which will become mandatory for new developments. Tree roots strengthen stream banks and woodland plants trap the sources of diffuse pollution before they reach the watercourse. Trees provide an important source of food and shelter for stream life and the intermittent shade provided by trees alongside rivers can help moderate water temperatures to the benefit of fish and insects (but management is essential because dense tree cover can harm the river ecosystem). In comparison to pasture, woodland can use more water, reducing the amount of water available in a catchment and it will be important to control this impact by varying species choice, age and the scale of wooded cover. Ongoing research and monitoring will be important, and the positive effect of woodland on water quality, landscape and associated recreational value may outweigh any impact on water supplies.

This is what we want to happen:

- The management of existing woodlands and the creation of new woodlands and hedgerows fully contribute to the protection and management of water and soil, at a local and catchment level.
- There is a more strategic and integrated approach to land use decisions and land management actions, so that woodlands play their full role in improving environmental quality, particularly water and soil resources, at a local and catchment level in Wales.
- Natural process approaches become mainstreamed across Wales so that woodlands and trees are used, where appropriate, to reduce surface water run-off from the upper catchments of our rivers, and manage flood risk in the lower reaches of rivers and urban areas.
- People recognise the importance of individual trees in both rural and urban areas and the benefits deriving from trees are quantified and acknowledged in decision making.



Forest School leader and pupils carrying felled tree to build shelter, Flintshire Forest School

7. Delivering Woodlands for Wales

This strategy has set out the outcomes that we require from woodlands and trees, to benefit the economy, environment and people of Wales and provide prosperity for all. Delivering this ambition, in the context of the challenges facing land use and management, should now be guided by the sustainable development principle. This requires us to act for the long term, to prevent problems from occurring in the first place or from getting worse, to consider how each outcome interacts with others and with the work of organisations across the public, private and voluntary sectors. All those involved in the public sector are now committed by this principle to work collaboratively and to involve people with an interest in achieving the outcomes we seek.

To implement the strategy we have set out for each of the outcomes what we want to see happen and in this chapter we explain how we plan to get there. The Action Plan we developed in 2015 (which will run until 2020) will be updated to make sure it guides the public sector to include woodlands and trees in their well-being objectives, and their plans. The plan will also set out how others, including businesses, and wider society can contribute and we will seek their active involvement in its delivery. Welsh Ministers have set out the principles on which they wish to see land management reformed after the UK leaves the European Union Community. A period of transition is essential so that we take advantage of what is a once-in-a-generation opportunity to deliver our vision for woodland. We will need to be adaptable. We have therefore not included detailed statements about actions in the strategy itself. The clear statement of policy set out here for our trees and woodlands, builds on our previous experience and provides a clear blueprint against which the success of future delivery mechanisms will be assessed.

The series of policy position statements that support *Woodlands for Wales* are still very relevant and will continue to be used and developed.

We also appreciate that we are still at the limits of our scientific and technical knowledge for some of the issues to be addressed. For instance, we need to know more about how best to manage our woodlands not only to deal with a changing climate but also to contribute to mitigating climate change. We need a better understanding of the ecosystem services delivered by different options for land use and woodland management. More specifically, we also need to know at what scale increasing the diversity of our woodlands becomes critical for delivering our desired outcomes. For all these reasons and more, we shall continue to develop our evidence base and technical implementation to ensure that the specific options we choose will best deliver our requirements. A combination of scientific and applied research, as well as technical development, will be required to continue the innovation in forestry practice in Wales, which has been such a feature over the last 100 years.

In 2013, Natural Resources Wales took on the responsibility for delivery of forestry regulations and for management of the WGWE. The Welsh Government took on direct responsibility for the development of policy, and for providing incentives. These arrangements face a significant new test as the UK prepares to leave the European Union. There are likely to be both challenges and opportunities ahead for forestry in Wales and our delivery plans need to be flexible enough to respond to these. That is why our refresh of the strategy has focussed strongly on the outcomes we want rather than the means to deliver them.

We expect that our existing mix of incentives, regulation and advice and the work of partnerships to deliver our ambitions will need to change. There is likely to be a period of transition, and there may be significant uncertainty about delivery. In this very fluid situation, delivering our full ambition for *Woodlands for Wales* will require a wider collective effort but will also involve innovative and bold thinking to develop successful delivery partnerships.

We know that some of the ambitions we have set out will involve significant change to the way land is managed in Wales. We expect the wider political and economic changes we now face to result in new pressures driving change in the natural environment. We must take advantage of these pressures, to help us to get the changes for the better that we want. We must also be aware that change is not always welcome and that many will see it as a threat. We must be sensitive to these concerns and aware of our collective ability to cope.

It will help us to manage change if there is a clear vision for Welsh Woodlands and a sense of direction to guide policy makers and others. In this revised strategy we have set out clear outcomes. We will need to have:

- **Good regulation** – giving the scope to control and guide changes to woodlands, whether this is creating new woodland or managing existing woodland.
- **Clear incentives** – making good use of limited public funds, and creating a space for private investment that also provides public goods.
- **Well informed advice and guidance** – from a range of sources, based on the best available science and innovation for trees woodlands and forests, for forest products and industry and for the services that trees woods and forests provide.

We will monitor and report on progress against both the Action Plan and our longer-term efforts to achieve the outcomes set in this strategy. As we highlighted in the introduction, these outcomes are inter-dependent and in many cases individual actions will contribute towards more than one outcome. We will build on our existing suite of indicators, and link these to the National Indicators and Milestones set out by Welsh Ministers under the Well-being Act.

Glossary

Adaptation: measures reducing vulnerability to climate change, eg increasing readiness for pests and winds, creating woodland networks, using woodlands in flood management.

Ancient woodland: sites that have been continuously wooded since before 1600AD.

Ancient semi-natural woodland (ASNW): ancient woodland where the trees and shrubs are semi-natural. These are generally the most important woodlands for biodiversity.

Biodiversity: the variety of ecosystems and living organisms (species), including genetic variation within species.

Carbon footprint: a representation of the effect that human activities have on the climate in terms of the net amount of greenhouse gases produced, usually measured as tonnes of carbon in the form of carbon dioxide equivalent.

Carbon sequestration: the flow of carbon into terrestrial or marine reservoirs. Biological sequestration includes direct removal of carbon dioxide from the atmosphere through land-use change, afforestation, reforestation, carbon storage in landfills and agricultural and forestry practices that enhance soil carbon.

Clear felling: Cutting down an area of woodland (if within a larger area of woodland it is typically a felling area greater than 0.25 hectares). Sometimes scattered or clumps of trees may be left standing within the felled area.

Climate change: natural and human-induced changes in the 'average weather' of a region. Note: 'global warming' was previously used synonymously with 'climate change', but this term has now been largely dropped.

Community: a group of people holding something in common – a place, or a common interest.

Continuous cover forestry (CCF): silvicultural systems whereby the forest canopy is maintained at one or more levels without clearfelling. CCF is just one example of a low impact silvicultural system.

Coppice: management based on regeneration by regrowth from cut stumps (coppice stools). The same stool is used through several cycles of cutting and regrowth. Coppice is just one example of a low impact silvicultural system.

Coppice with standards: coppice with a scatter of trees of seedling or coppice origin, grown on a long rotation to produce larger sized timber and to regenerate new seedlings to replace worn out stools.

Decarbonisation: is the process of adapting our way of life as humans in order that we can reduce the amount of fossil carbon emitted to the atmosphere. This may be by avoiding emissions by using alternative energy sources or, by reducing emissions by less energy-intensive materials or by taking action such as tree planting to sequester carbon from the atmosphere. The Environment (Wales) Act places a duty on the Welsh Ministers to ensure that in 2050 net emissions are at least 80% lower than the baseline set in legislation.

Deforestation: the creation of permanent open ground that decreases the area of the woodland. (The internal re-design of woodlands to meet the requirements of the UK Forestry Standard is not considered to be deforestation in the context of this strategy).

Ecosystem: the interaction of communities of plants and animals (including humans) with each other and the non-living environment. Balanced ecosystems are stable when considered over the long term (hundreds of years in the case of woodlands).

Ecosystem services: humankind benefits from a multitude of resources and processes supplied by natural ecosystems. Collectively, these benefits are known as ecosystem services. Ecosystem services are distinct from other ecosystem products and functions because there is human demand for these natural assets. Many studies have attempted to quantify the economic value of these services.

They include:

- **Provisioning services** – such as food water and timber.
- **Cultural services** – such as the provision of recreational, health, aesthetic, and spiritual benefits.
- **Regulating services** – such as the protection of water and soil resources within catchments; contributing to the reclamation of contaminated land, shelter, shade and cooling in towns, and wind breaks (shelterbelts) on farmland.
- **Supporting services** – such as net carbon sequestration (locking up atmospheric carbon), soil formation and photosynthesis.

Forests: generally large areas of predominantly tree covered land.

Forest School: an innovative educational approach to outdoor play and learning. The philosophy of Forest Schools is to encourage and inspire individuals of any age through regular positive outdoor experiences. Forest Schools in Britain have been developed and adapted from the original concept implemented in Sweden in the 1950s and developed throughout other Scandinavian and European Countries.

Gross Value Added: the current recognised method of assessing the economy and the proportion which different industries contribute towards it (formally known as GDP – Gross Domestic Product)

low impact silvicultural systems (LISS): silvicultural systems which are alternatives to clear-felling and minimise the environmental impact. They include a range of less intensive silvicultural systems such as group selection or shelterwood.

Mitigation: interventions to reduce climate change, eg greater use of wood as a source of renewable energy or as a carbon store.

Mixed woodland: mixtures can occur at a number of different scales. Intimate mixtures are stands containing a variety of tree species. Group plantings of various sizes, prescriptions and complexity. Also included here are Line mixtures, traditionally quite common in British forestry, often with one species used as a nurse for the main crop. Landscape-scale mixtures with plantings of individual species at a stand scale but creating a matrix of mixed species at a landscape scale. Reducing the size of clearfell coupes also creates a more mixed landscape in terms of age. All types of mixtures have their place, with differing advantages and disadvantages in meeting objectives, impacts on the intensity and style of management required and operational implications, particularly where regular timber harvesting is an objective. General assumptions are that more intimate mixtures are best within lower, more fertile woodlands, and simpler structures and species diversity in woodlands at higher elevations and of lower fertility.

Native species: one that arrived in Wales without assistance of humans during post-glacial colonisation.

Native woodland: woods mainly or entirely composed of locally native species.

Natural Resources Wales (NRW):

established in 2013, drawing together the functions of the Environment Agency, Countryside Council for Wales and the Forestry Commission. In relation to woodland, NRW has responsibilities which include delivery of forest regulations, managing the 38% of Welsh woods owned by the Assembly and promoting the interests of forestry.

New native woodland: newly established woodland of at least 80% native species. The creation of new native woodland can be through natural regeneration, colonisation or planting on currently unwooded ground.

Origin (of trees): the geographic location within the natural range of a species where the parent seed source or its wild ancestors grew.

Plantation: woodland where the current trees have been planted. Often includes naturally regenerating trees as well. Includes former semi-natural woodlands restocked by planting.

Planted Ancient Woodland Sites (PAWS): former Ancient Semi-natural Woodland (ASNW) that has been more or less completely replanted with native or non-native species and the ecological value has been degraded. The degree of loss of biodiversity varies markedly with species planted and subsequent management.

Priority open habitats: non-woodland habitats identified as threatened and listed under Section 7 of the Environment (Wales) Act. These include upland heathland, blanket bog, lowland dry acid grassland, lowland meadows and lowland calcareous grassland.

Priority species/priority woodland species: species identified as threatened and listed under Section 7 of the Environment (Wales) Act. Priority woodland species in Wales include the spotted flycatcher, wood warbler, black grouse, bullfinch, red squirrel, dormouse and several species of bat.

Priority woodland habitats/priority native woodland habitats:

woodland habitats identified as threatened and listed under Section 7 of the Environment (Wales) Act. There are five types in Wales: upland oak woodland, upland mixed ash woodland, wet woodland, lowland beech and yew woodland and lowland mixed broadleaf woodland.

Production potential: the volume of timber that could potentially be harvested sustainably from the woodland area. This volume is determined by factors such as the growth rate of the trees on site, the practicality of harvesting the timber, and other site objectives such as biodiversity, conservation and recreation.

Provenance: the geographic location where the tree seeds were collected. Designation of Regions of Provenance under the Forest Reproductive Materials regulations is used to help nurseries and growers select suitable material. The term is often confused with 'origin', which is the original natural genetic source.

Renewable energy: includes non-carbon technologies such as solar energy, hydropower, wind and tidal power, as well as carbon-neutral fuel sources such as biomass.

Semi-natural woodland: in the UK no truly 'natural' woods remain. Semi-natural woodlands have current stands predominantly composed of trees and shrubs that are native to the site and are not obviously planted. Thus they appear to have arisen mainly from natural regeneration or from coppice/pollard growth from naturally regenerated individuals.

Shelterbelts: one or more rows of trees planted to provide windbreaks and protection from soil erosion. They may also act as visual screens, wildlife habitat, or a source of wood products.

Shelterwood system: felling of a proportion of the trees within an area leaving some trees as a seed source and shelter for natural regeneration. The seed trees are subsequently removed.

Short rotation coppice (SRC): coppice grown as a long-term woody perennial crop that is harvested usually every 3 years. The growing of willow SRC is more comparable to agricultural cropping methods than to forestry.

Short rotation forestry (SRF): cultivation of fast-growing trees for 8-20 years, often with the aim of creating fuel wood. Often the trees are coppiced.

Silviculture: the techniques of tending and regenerating woodlands, and harvesting their physical products.

Stand: a distinct sub-division of a woodland, having relatively uniform species composition, age, and condition; to be considered an homogeneous unit for management purposes.

Sustainability: in a general sense, the capacity to maintain a certain process or state indefinitely. The concept of sustainability applies to all aspects of life on Earth and is commonly defined within ecological, social and economic contexts.

Sustainable forest management: 'The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems'. (Second Ministerial Conference on the Protection of Forests in Europe, Helsinki; 1993).

UK Forestry Standard: the UK government's approach to sustainable forestry. It sets out the criteria and standards for the sustainable management of all forests and woodlands in the UK.

UK Woodland Assurance Standard: This is an independent certification standard for verifying sustainable woodland management in the UK. The UK Woodland Assurance Standard (UKWAS) is currently the central component of the forest certification programme operated in the UK by the Forest Stewardship Council for example.

Veteran tree: a tree which, because of its great age, size or condition is of exceptional value culturally, within the landscape or for wildlife.

Welsh Government Woodland Estate (WGWE): the woodland originally acquired under the provisions or for the purposes of the Forestry Act 1967 which is held by Welsh Ministers and placed at the disposal of NRW who manage it.

Woodland: land where the ecological condition is, or will be, strongly influenced by the tree canopy. In terms of land cover statistics (in the UK), woodland is currently defined as land with trees where the mature trees would cover more than 20% by area. Large tracts are generally called forests, smaller units are described in a variety of terms such as woodlands, woods, copses and shelterbelts. There is no minimum size for a woodland.

Woodland sites of local, national and

international importance: internationally protected sites include Natura 2000 sites protected under the EC Habitats and Birds Directives (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) and sites protected under the RAMSAR Convention on Wetlands of International Importance. Nationally protected sites include National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSIs). Sites of local conservation interest are designated by Local Authorities and are a material consideration when planning applications are being determined. In Wales they are usually referred to as Sites of Importance for Nature Conservation (SINCs), or Regionally Important Geological and Geomorphological Sites (RIGS).